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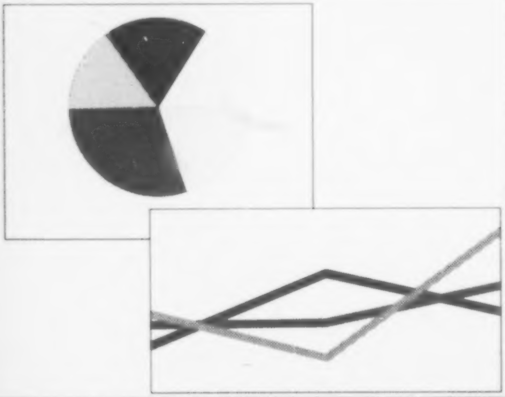
The Economic Handbook of The Machine Tool Industry



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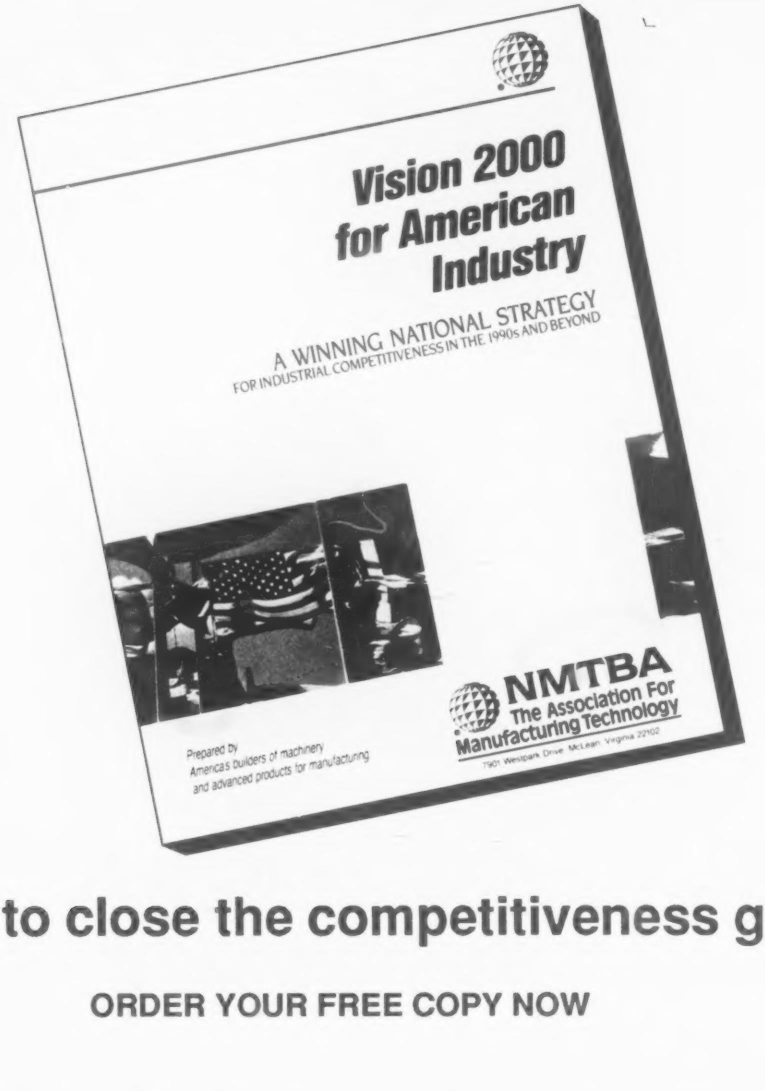

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1991–1992
Economic Handbook of the Machine Tool Industry

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The Association For Manufacturing Technology

7901 WESTPARK DRIVE, McLEAN, VIRGINIA 22102-4269
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MESSAGE FROM THE PRESIDENT OF NMTBA

U.S. machine tool exports set a new record in 1990, at just over $1 billion. This marks the seventh consecutive annual gain in exports, and provides solid evidence of growing U.S. competitiveness. The importance of a healthy U.S. machine tool industry to U.S. economic well–being cannot be overstated: the production of over $1 trillion a year in durable goods such as automobiles, airplanes, farm machinery and construction equipment, is only possible with continued investment in machine tools.

As the U.S. industry accelerates, world machine tool competition is turning up the heat. Nations such as China and South Korea are developing fast, while Europe is set for continued restructuring and major efficiency improvements. At the same time, the challenge to the machine tool industry is as big, or perhaps bigger, than to any other industry. The machine tool builder must bring together basic machines with sophisticated software and electronics; and become knowledgeable in disciplines ranging from materials technology to advanced sensors. We have come to a critical stage in world competitiveness, and the victors will be those that can best utilize the strategic information and resources to stay a step ahead of the competition.

In the fall of 1990, we at NMTBA kicked off our "Vision 2000" initiative to meet the needs of our members and to help ensure our country's continued global competitiveness. Manufacturing technology will be at the forefront of our nation's larger effort to reverse its competitive decline during the 1980s. NMTBA competitiveness programs call for help for exporters; education and training funding; support for research and development; quality and metrication initiatives; the promotion of balanced, productive U.S. laws and regulations; and providing important economic and marketing data and information.

This Economic Handbook is one part of our efforts to provide our industry the basic information necessary for strategic planning. But while the statistics in the Handbook are wide ranging and provide useful indicators, they do not readily show the true impact and significant role of the machine tool industry to our national economy. Annual spending on machine tools is small. Yet the impact of machine tools and manufacturing technology in terms of its contribution to our nation's competitiveness, prosperity and future wealth is far greater than the size of the industry suggests.

Albert W. Moore
President

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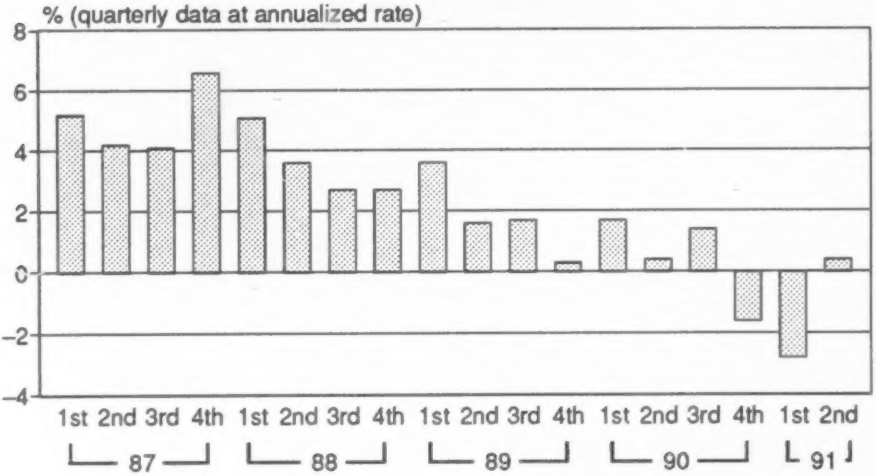
GLOSSARY

OVERVIEW OF THE U.S. ECONOMY

The longest peacetime ecomomic expansion in U.S. history came to an end in July 1990. Pervasive weakness in the finance and real estate sectors led to a "credit crunch," which affected the ability of many small businesses across the country to obtain financing.

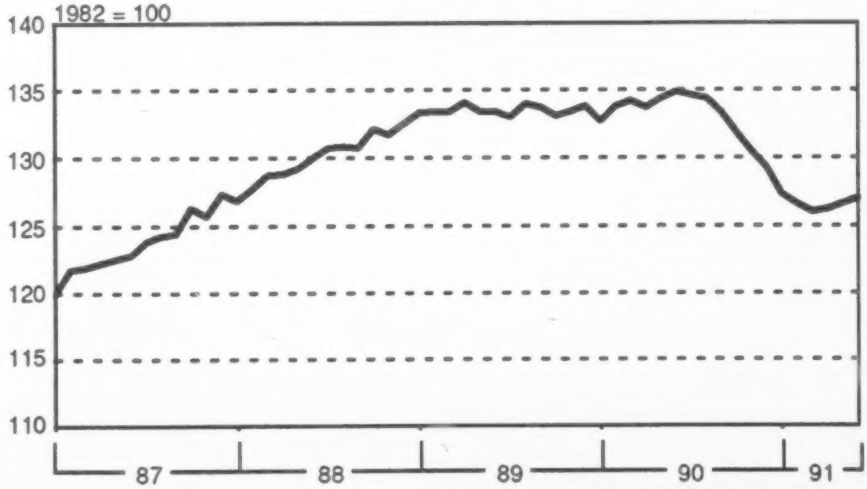
U.S. Real GNP Growth Rate



Source: U.S. Bureau of Economic Analysis

The economy had been growing slowly in the 18 months leading up to the recession. The Index of Coincident Economic Indicators, which measures current business activity, reflected this sluggish growth, and in July 1990 began a steep decline.

Index of Coincident Economic Indicators



Source: U.S. Bureau of Economic Analysis

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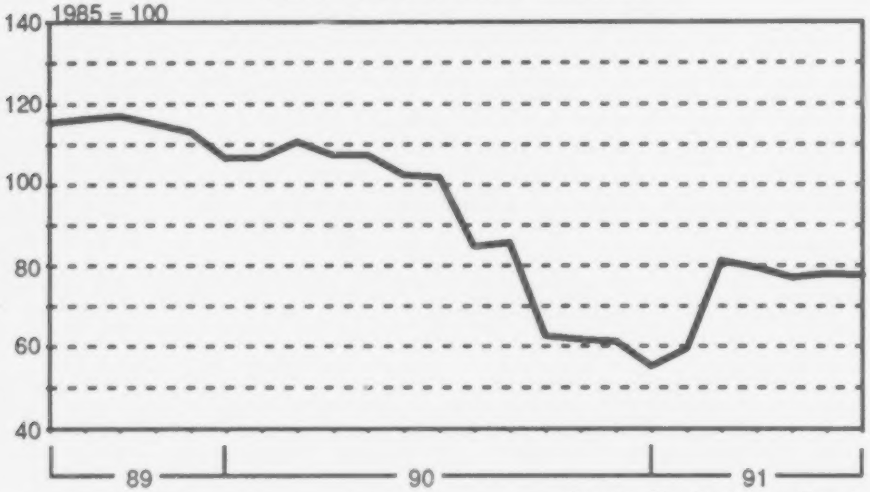
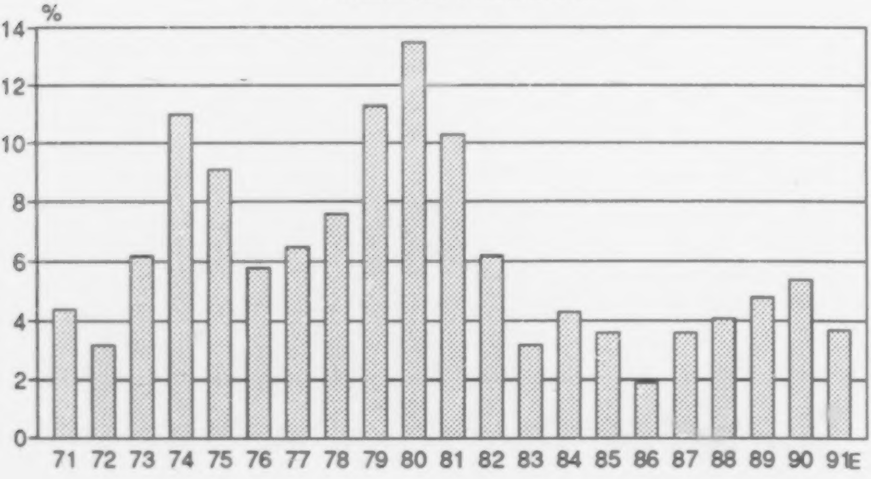
In August 1990, the Iraqi invasion of Kuwait pushed the price of gasoline and other energy–related products up rapidly. The prospect of both inflation and recession caused consumer confidence to plummet, and created uncertainties which accelerated the effects of the recession. However, the success of coalition forces in the war with Iraq helped restore the price of oil to its pre–invasion levels and gave a boost to consumer confidence. Lower energy prices have helped to moderate inflation in 1991. Inflation, as measured by the consumer price index, is expected to run between 3.5 and 4.0 percent this year, compared with a 1990 rate of 5.4 percent.

Index of Consumer Confidence



Source: The Conference Board

Average Annual Rate of Inflation
Consumer Price Index



Source: U.S. Bureau of Labor Statistics

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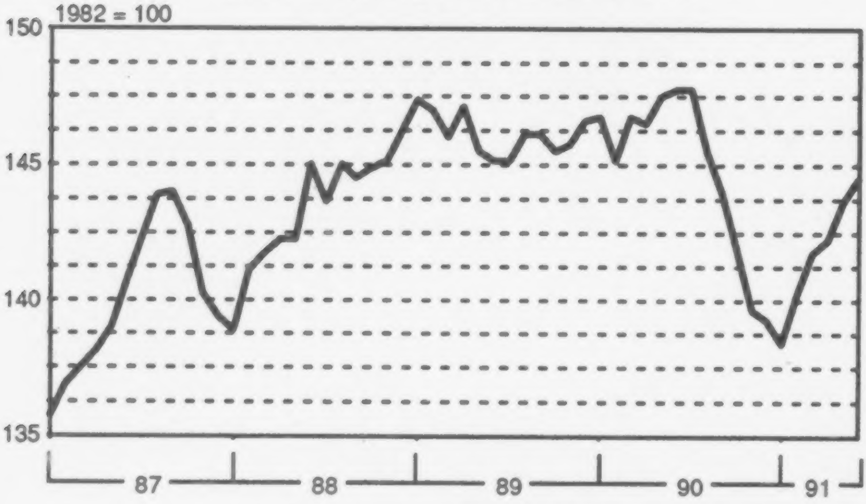
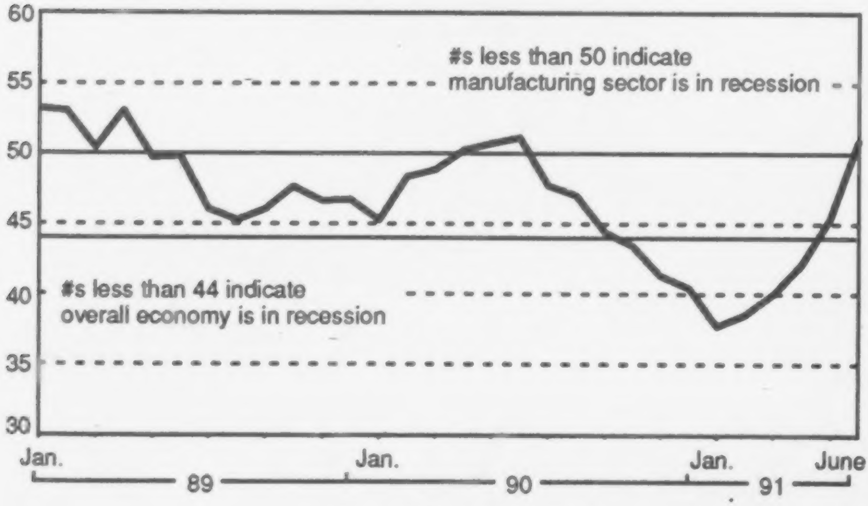
By mid–1991 signs were emerging which suggested the recession had reached its trough. Real Gross National Product increased 0.4 percent in the second quarter of 1991. The Index of Leading Economic Indicators bottomed out in January and rose the next five months. The Purchasing Managers Index, a popular measure of strength in the manufacturing economy, also showed a sharp improvement. Employment in the Durable Goods Manufacturing industries stabilized after falling for 14 consecutive months.

Index of Leading Economic Indicators



Source: U.S. Bureau of Economic Analysis

Purchasing Managers Index



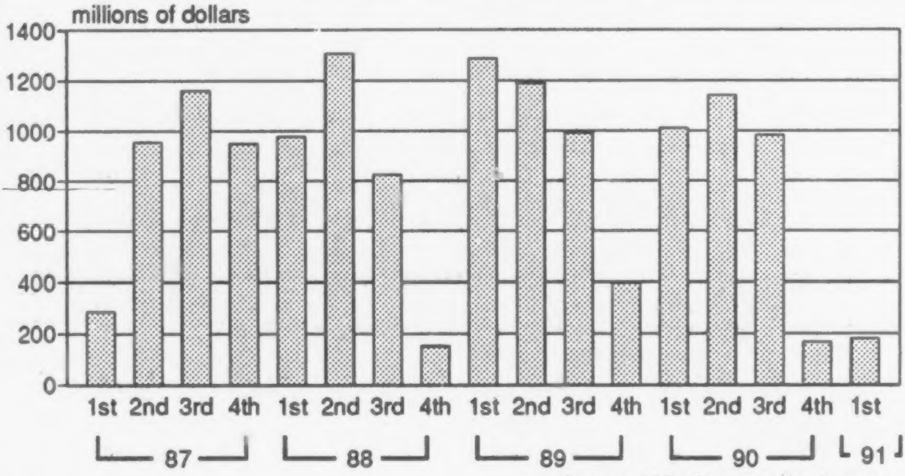
Source: National Association of Purchasing Management

Investment Trends in Machine Tool Consuming Industries

THE FABRICATED METAL PRODUCTS INDUSTRY (SIC 34)

Over the past few quarters profitability in the fabricated metal products industry has fallen as a result of the economic downturn.

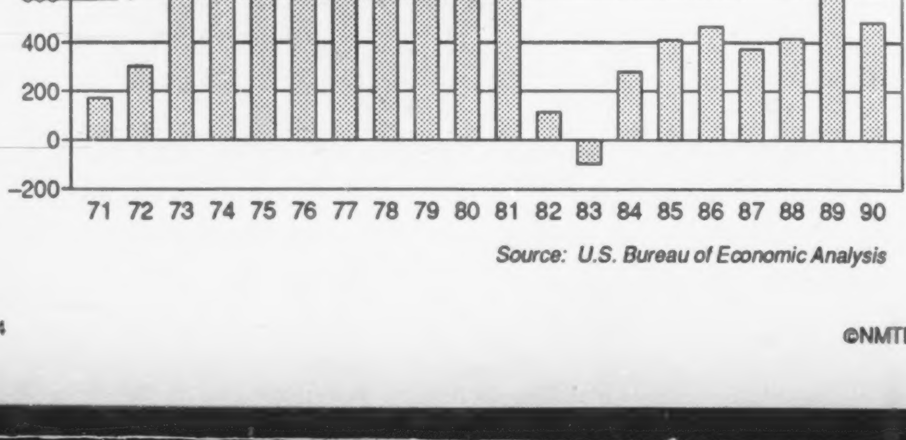
Retained Earnings in the Fabricated Metal Products Industry



Source: U.S. Bureau of the Census

Net investment (new investment less depreciation) in metalworking machinery by the fabricated metal products industry has been positive over the last several years, but at a rate much reduced from the 1970s. As a result, the average age of metalworking equipment has risen steadily since 1981.

Net Investment in Metalworking Machinery by the Fabricated Metal Products Industry



Source: U.S. Bureau of Economic Analysis

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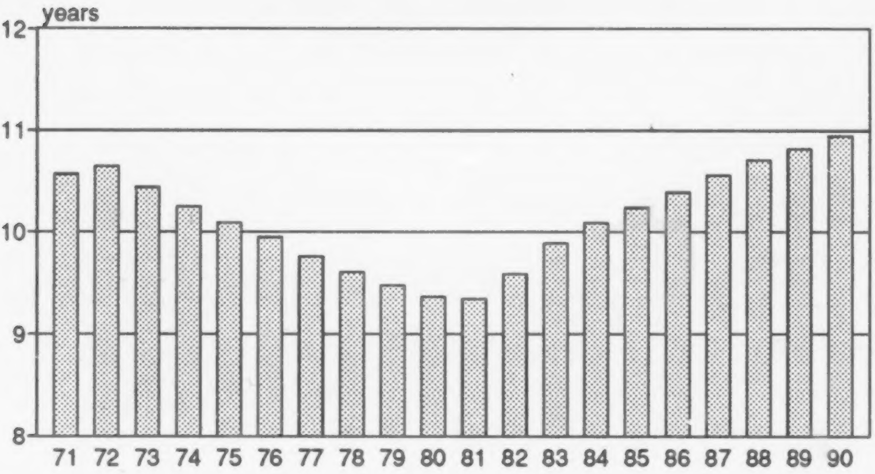
Average Age of Metalworking Machinery in the Fabricated Metal Products Industry

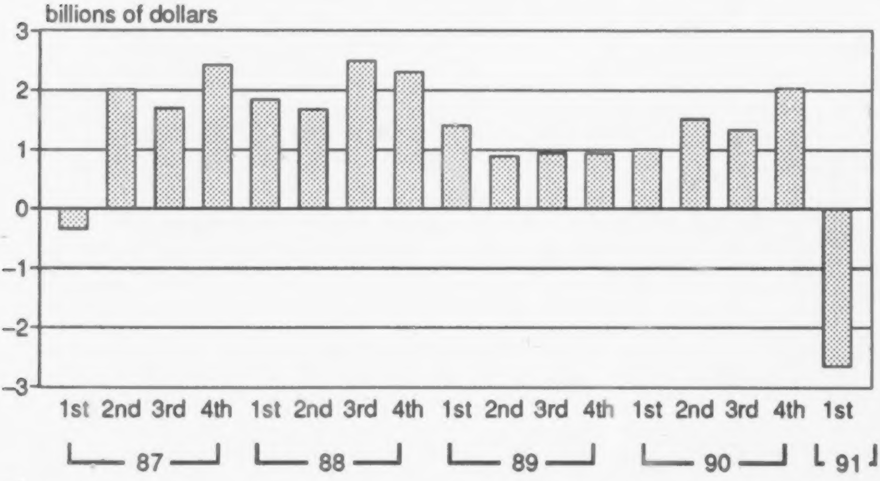


Source: U.S. Bureau of Economic Analysis

THE INDUSTRIAL MACHINERY INDUSTRY (SIC 35)

The industrial machinery sector (non–electrical machinery) bucked the trend in 1990 by recording higher profits despite the economic downturn. Profits fell sharply in the first quarter of 1991 and recent developments in the computer industry make it likely that this sector's profits will be under pressure for the foreseeable future.

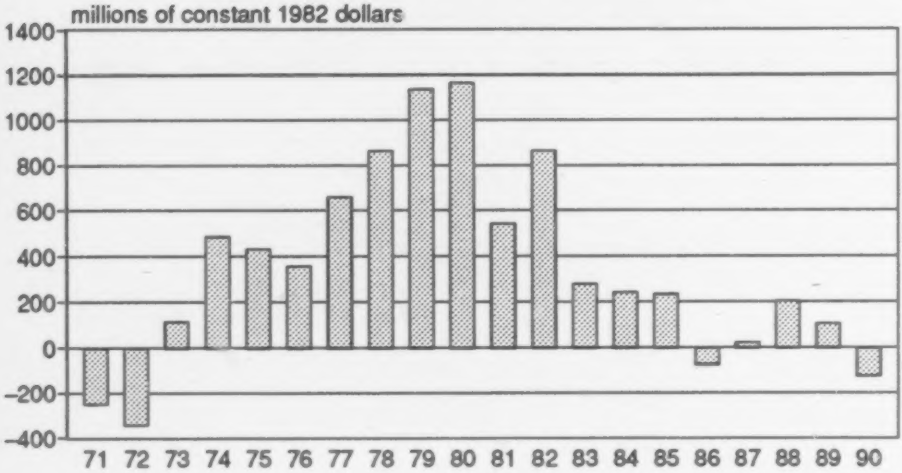
Retained Earnings in the Industrial Machinery Industry



Source: U.S. Bureau of the Census

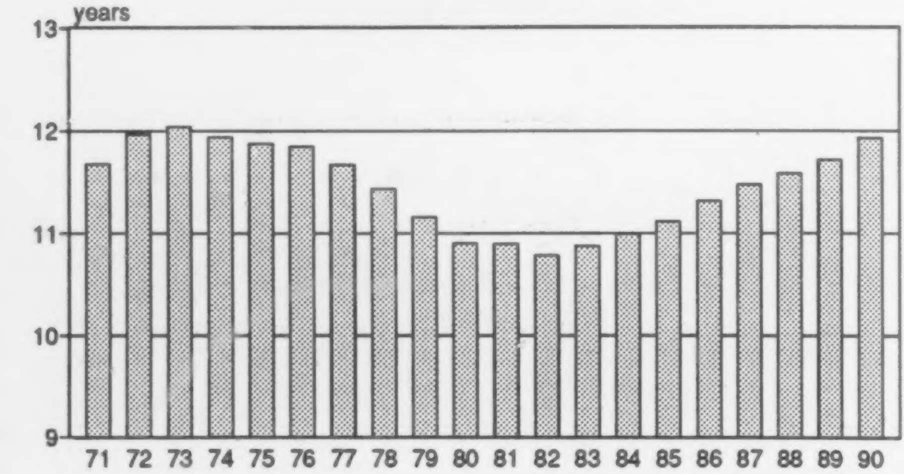
Capital investment in recent years has been very weak by historical standards. Investment in metalworking machinery has also lagged. As a result, the average age of metalworking machinery used in the industry has risen over the past eight years.

Net Investment in Metalworking Machinery by the Industrial Machinery Industry



Source: U.S. Bureau of Economic Analysis

Average Age of Metalworking Machinery in the Industrial Machinery Industry



Source: U.S. Bureau of Economic Analysis

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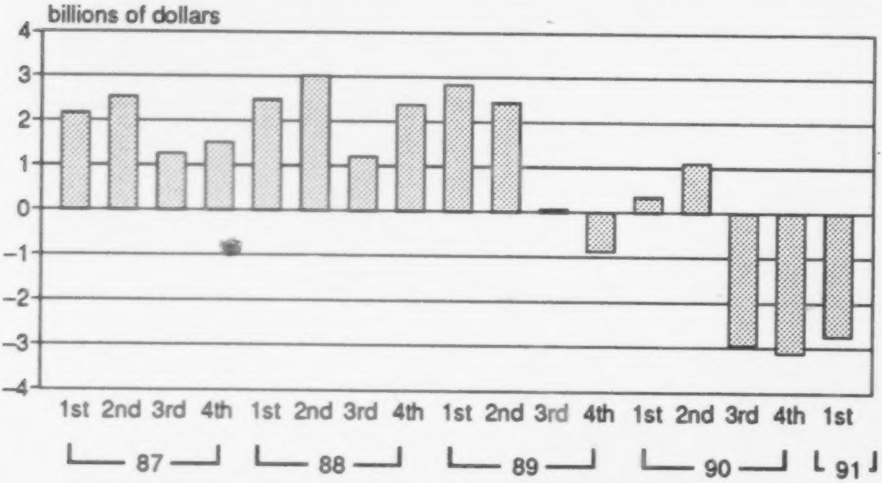
THE MOTOR VEHICLE AND EQUIPMENT INDUSTRY (SIC 371)

The recession put a damper on the automotive industry in 1990. Purchases of new cars fell after the invasion of Kuwait and earnings in the automotive industry fell sharply in the second half of 1990, and into 1991. Scrappage rates have now outpaced new production for several years, and the average age of cars being driven is increasing.

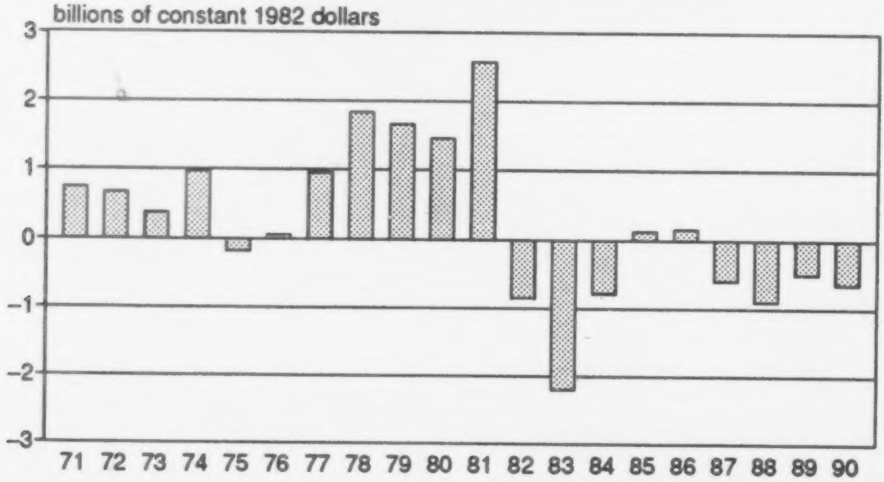
Retained Earnings in the Motor Vehicle and Equipment Industry



Source: U.S. Bureau of the Census

Automotive investment in metalworking machinery has been weak for nearly a decade. The graph below shows that new investment has not managed to offset depreciation, which results in negative net investment in metalworking machinery. As a result, the stock of metalworking machinery has aged rapidly over the last few years.

Net Investment in Metalworking Machinery by the Motor Vehicle and Equipment Industry



Source: U.S. Bureau of Economic Analysis

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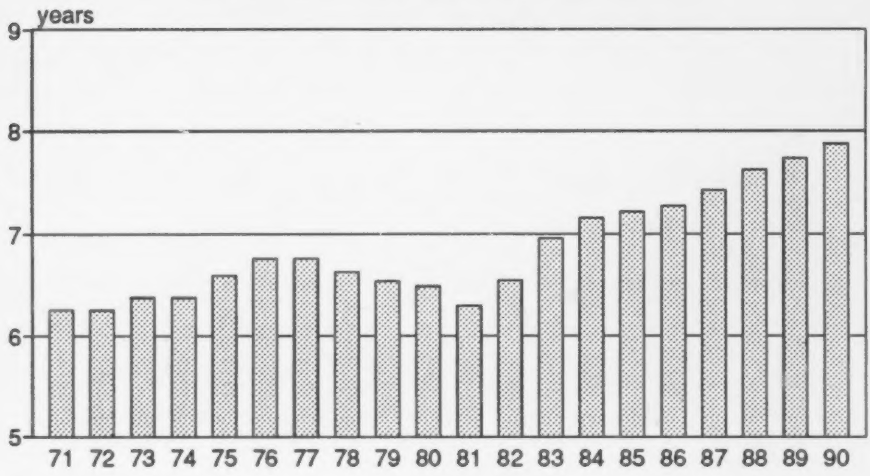
Average Age of Metalworking Machinery in the Motor Vehicle and Equipment Industry

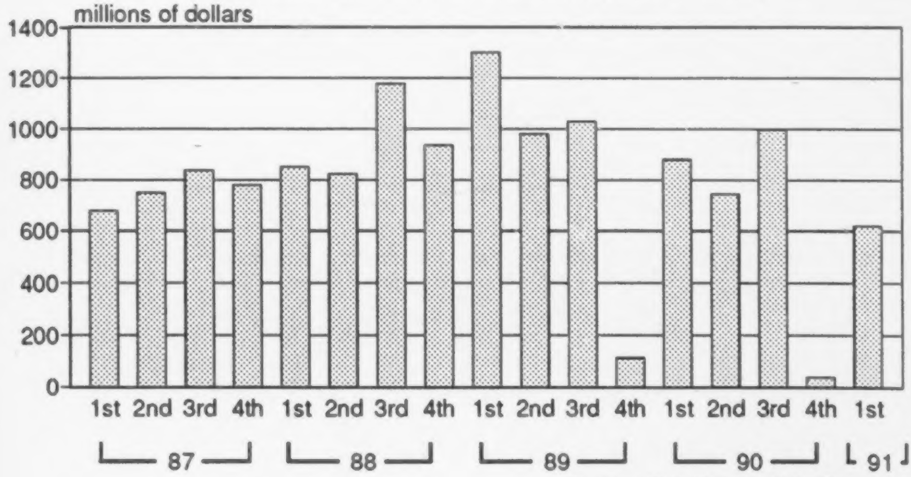


Source: U.S. Bureau of Economic Analysis

THE TRANSPORTATION EQUIPMENT INDUSTRY (OTHER THAN AUTOS; SIC 37 less 371)

The aerospace industry dominates this group. Defense orders have fallen in the post–Cold War era, but the commercial aerospace sector remains strong. Earnings in the industry have held up despite the recession.

Retained Earnings in the Aerospace Industry



Source: U.S. Bureau of the Census

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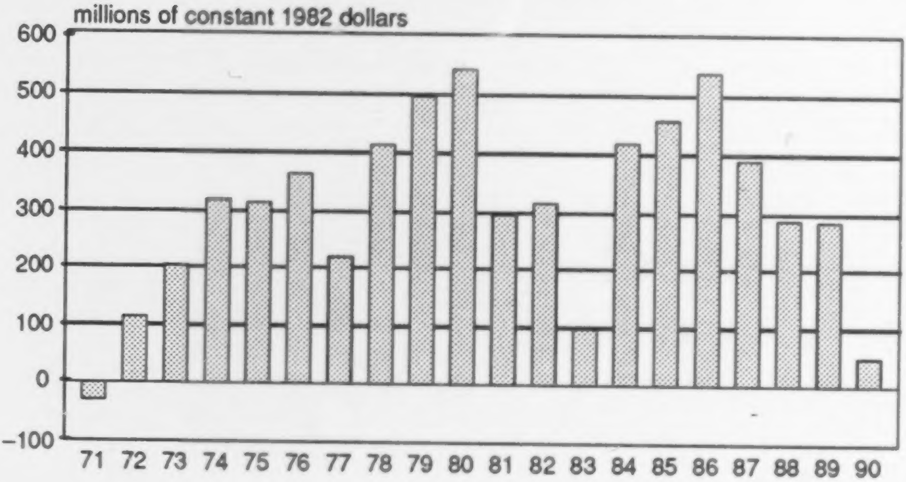
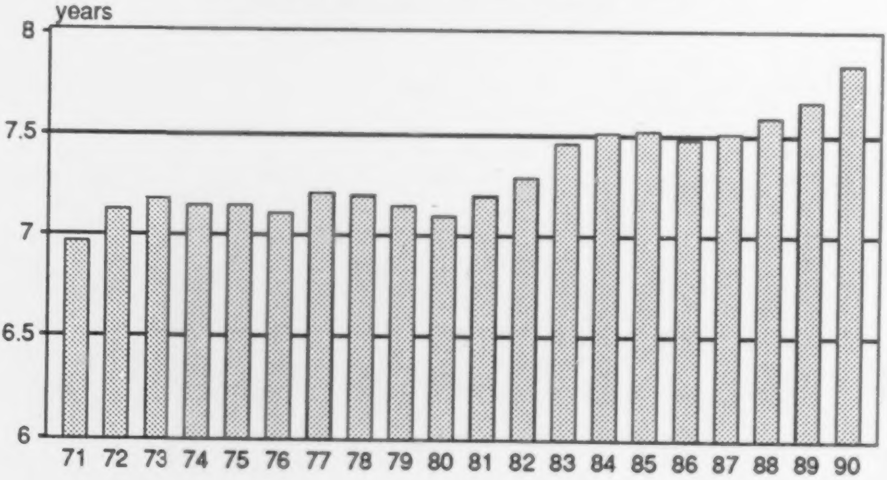
Net investment in metalworking equipment by the transportation equipment industry has fallen steadily in the past few years and the average age of equipment in use has begun to creep up.

Net Investment in Metalworking Machinery by the Transportation Equipment Industry (except Motor Vehicles and Equipment)



Source: U.S. Bureau of Economic Analysis

Average Age of Metalworking Machinery in the Transportation Equipment Industry (except Motor Vehicles and Equipment)

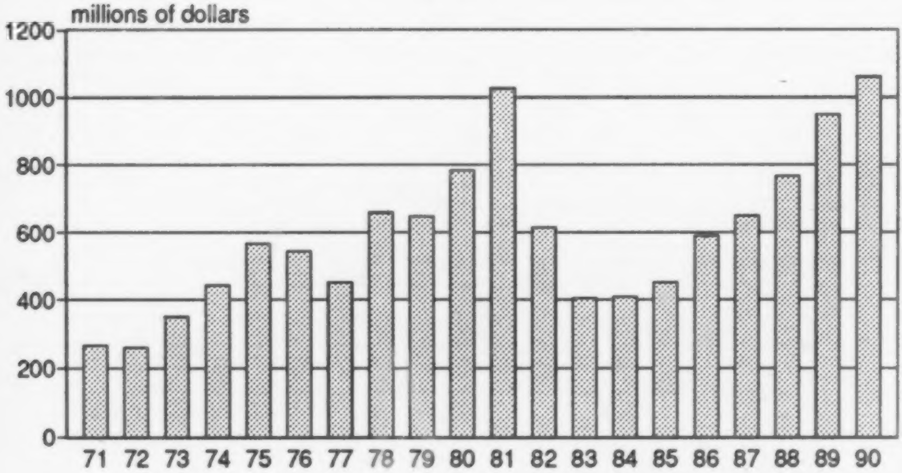


Source: U.S. Bureau of Economic Analysis

Outlook for the Machine Tool Industry

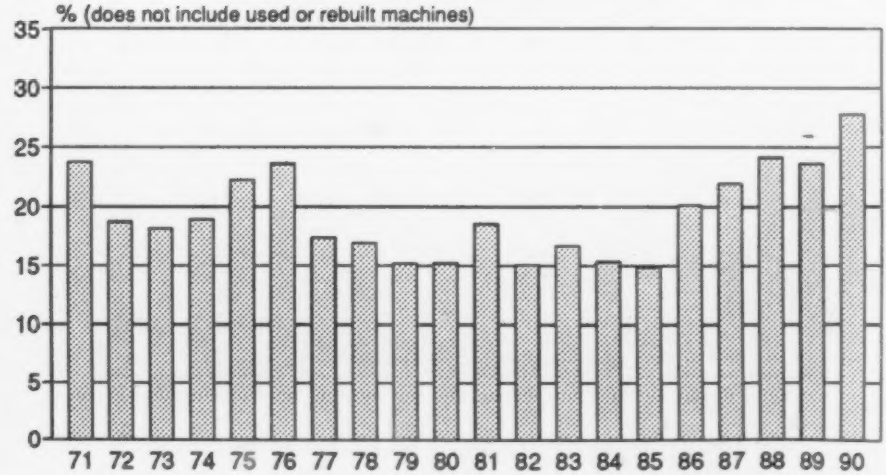
For the U.S. machine tool industry, 1990 was a record year for exports which topped $1 billion. For the year, exports gained 11.9 percent over 1989. Exports have been rising steadily for seven years, while their share of domestic production has increased to over 25 percent.

U.S. Exports of Machine Tools



Source: U.S. Bureau of the Census

Exports of U.S. Machine Tools as a Percent of Domestic Production



Source: U.S. Bureau of the Census

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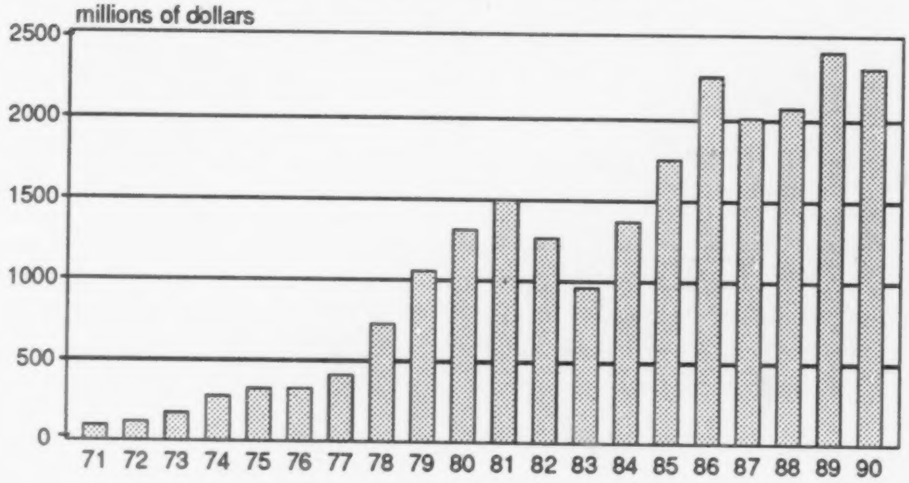
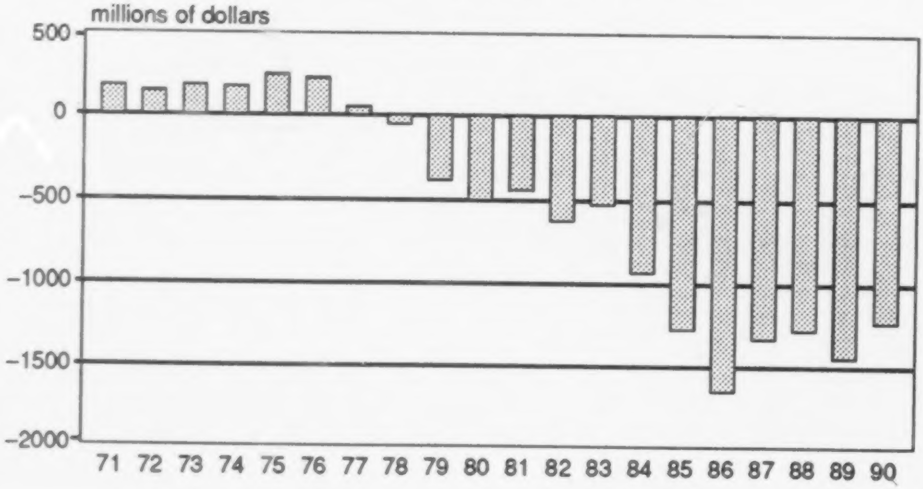
Imports of machine tools fell in 1990 and, with the gain in exports, the balance of trade in machine tools improved noticeably. Higher exports and lower U.S. production combined to lower U.S. consumption by 6.6 percent in 1990 to $4.6 billion. Import penetration, after rising steadily during the first–half of the 1980s, has stabilized over the last few years, and increased slightly, to 47.0 percent in 1990, according to preliminary data.

U.S. Imports of Machine Tools



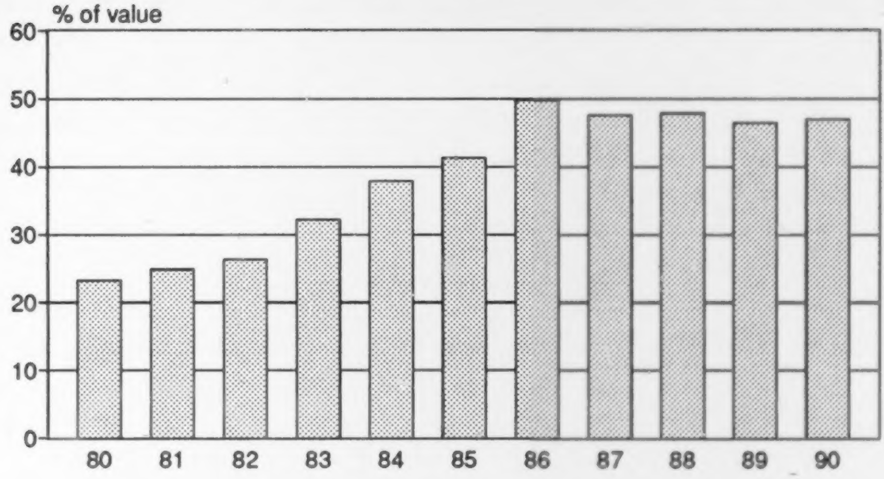
Source: U.S. Bureau of the Census

U.S. Machine Tools Balance of Trade



Source: U.S. Bureau of the Census

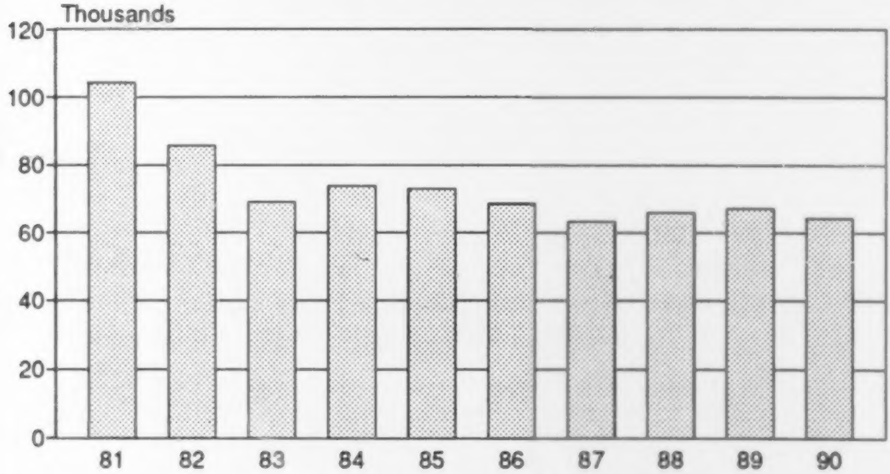
Import Penetration Rate



Sources: U.S. Bureau of the Census and NMTBA

Domestic production of machine tools fell in 1990, in part because of the slowdown in the manufacturing sector which began before the current recession. Employment levels in the industry have also been affected by the economic downturn. Employment fell to an annual average of 64,300 in 1990, down 4.5 percent from 1989.

Employment in the Machine Tool Industry



Source: Bureau of Labor Statistics

The consensus forecast for the remainder of 1991 and the first–half of 1992 is for a mild economic recovery. Many experts believe that the recovery will be dominated not by consumer spending but by investment spending. The aging stock of metalworking equipment is one indication that there is a growing need for such investment.

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U.S. Machine Tool Consumption: Production, Imports and Exports

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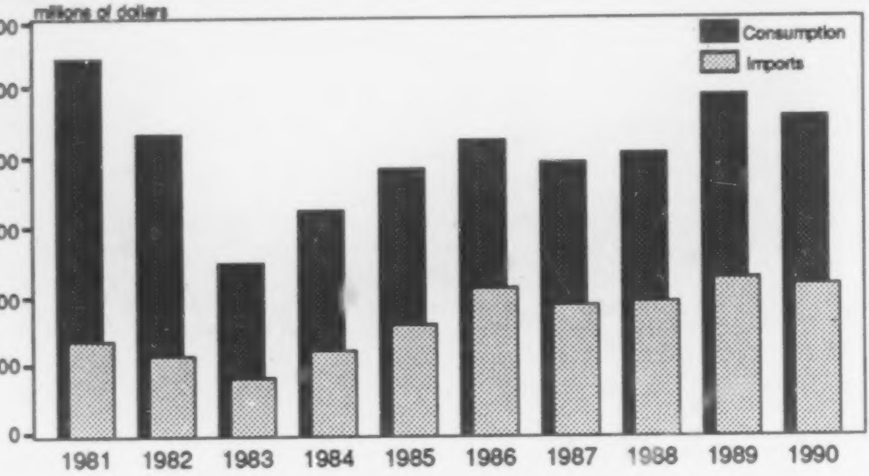


VALUE
(in millions of dollars)

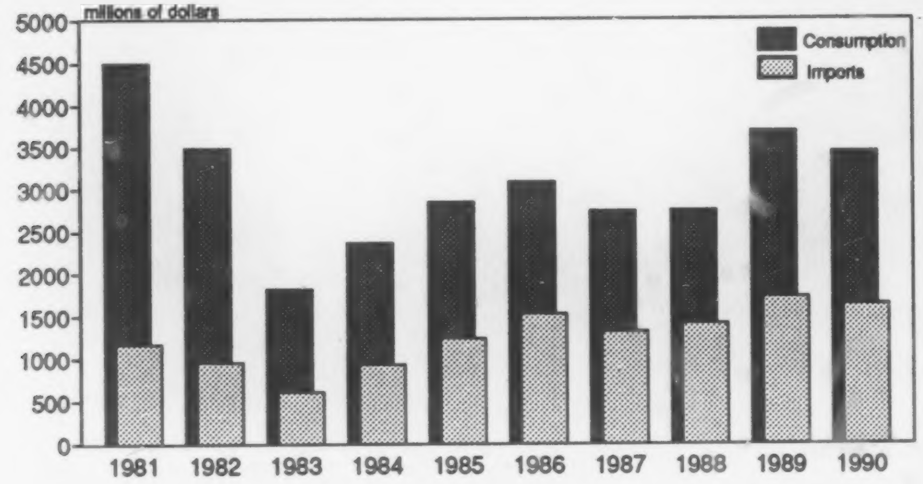
Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$5,007.8	$1,355.9	$924.1	$5,439.6	24.9%
1982	3,736.4	1,144.1	556.5	4,325.9	26.4%
1983	1,986.2	832.4	345.0	2,473.6	33.7%
1984	2,362.2	1,218.9	360.9	3,220.2	37.9%
1985	2,623.6	1,582.1	387.1	3,818.6	41.4%
1986	2,655.6	2,10[illegible]	530.7	4,230.7	49.8%
1987	2,612.1	1,859.9	567.7	3,904.2	47.6%
1988(r)	2,795.2	1,913.4	670.9	4,037.8	47.4%
1989(r)	3,453.4	2,246.3	812.3	4,887.4	46.6%
1990(p)	3,326.0	2,147.9	908.3	4,565.5	47.0%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	87,981	47,034	14,362	120,653	39.0%
1982	53,141	35,286	9,017	79,410	44.4%
1983	43,199	24,864	5,654	62,409	39.8%
1984	49,515	37,062	6,601	79,976	46.3%
1985	50,108	47,014	7,602	89,520	52.5%
1986	45,981	47,008	8,428	84,561	55.6%
1987	43,028	37,975	9,447	71,556	53.1%
1988(r)	50,992	42,740	12,468	81,264	52.6%
1989(r)	52,114	50,035	17,981	84,168	59.4%
1990(p)	46,399	47,011	20,544	72,866	64.5%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

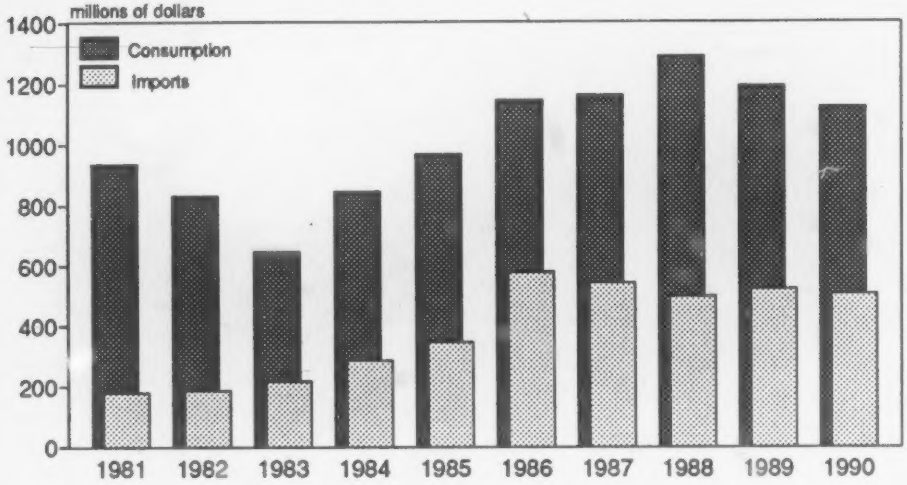
Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$3,979.0	$1,174.5	$649.4	$4,504.1	26.1%
1982	2,899.4	956.7	361.8	3,494.3	27.4%
1983	1,432.2	613.6	220.3	1,825.5	33.6%
1984	1,654.2	933.2	213.9	2,373.5	39.3%
1985	1,846.8	1,235.0	232.8	2,849.1	43.3%
1986	1,880.5	1,526.7	322.1	3,085.2	49.4%
1987	1,748.7	1,316.9	324.2	2,741.3	48.0%
1988(r)	1,698.6	1,415.0	366.7	2,746.9	51.5%
1989(r)	2,391.0	1,723.0	419.9	3,694.2	46.6%
1990(p)	2,319.8	1,640.5	518.3	3,442.0	47.7%

UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	66,076	41,884	9,232	98,728	42.4%
1982	35,060	30,652	5,731	59,981	51.1%
1983	27,088	19,979	3,442	43,625	45.8%
1984	31,741	29,707	3,891	57,557	51.6%
1985	31,425	38,182	4,431	65,176	58.6%
1986	27,991	37,204	5,384	59,811	62.2%
1987	25,449	29,355	5,351	49,453	59.4%
1988(r)	30,445	34,249	6,641	58,053	59.0%
1989(r)	31,566	36,450	9,435	58,581	62.2%
1990(p)	26,419	35,883	11,671	50,631	70.9%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

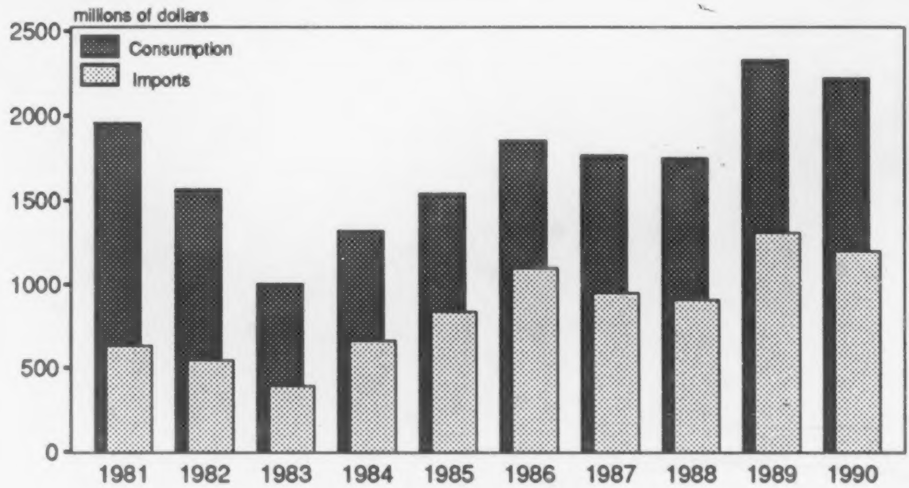
Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$1,028.9	$181.3	$274.8	$ 935.5	19.4%
1982	839.0	187.4	194.7	831.7	22.5%
1983	554.0	218.8	124.7	648.1	33.8%
1984	708.0	285.7	147.0	846.7	33.7%
1985	776.7	347.2	154.4	969.5	35.8%
1986	775.1	579.1	208.7	1,145.5	50.5%
1987	863.3	543.1	243.5	1,162.9	46.7%
1988	1,096.6	498.4	304.1	1,290.9	38.6%
1989(r)	1,062.3	523.3	392.4	1,193.2	43.9%
1990(p)	1,006.2	507.4	390.0	1,123.5	45.2%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	21,905	5,150	5,130	21,925	23.5%
1982	18,081	4,634	3,286	19,429	23.9%
1983	16,111	4,885	2,212	18,784	26.0%
1984	17,774	7,355	2,710	22,419	32.8%
1985	18,683	8,832	3,171	24,344	36.3%
1986	17,990	9,804	3,044	24,750	39.6%
1987	17,579	8,620	4,096	22,103	39.0%
1988	20,547	8,491	5,827	23,211	36.6%
1989(r)	20,548	13,585	8,546	25,587	53.1%
1990(p)	19,980	11,128	8,873	22,235	50.0%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

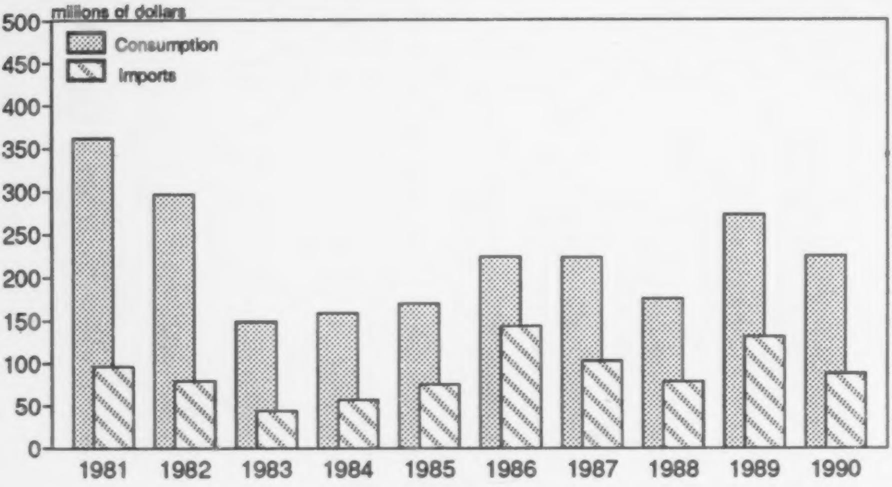
Year	Shipments	+	Imports	–	Exports	=	U.S. Consumption	% Import Penetration
1981	$1,467.3		$ 632.7		$154.3		$1,945.7	32.5%
1982	1,126.6		547.8		129.5		1,544.9	35.5%
1983	677.1		393.2		71.0		999.3	39.3%
1984	739.5		661.3		86.5		1,314.4	50.3%
1985	792.0		834.5		96.2		1,530.3	54.5%
1986	843.5		1,092.9		95.3		1,841.1	59.4%
1987	931.0		947.6		124.0		1,754.6	54.0%
1988	991.9		903.9		157.4		1,738.4	52.0%
1989(r)	1,263.4		1,301.0		253.3		2,311.1	56.3%
1990(p)	1,364.9		1,194.4		355.0		2,204.3	54.1%

UNITS

Year	Shipments	+	Imports	–	Exports	=	U.S. Consumption	% Import Penetration
1981	8,945		7,530		1,222		15,253	49.4%
1982	6,066		5,962		1,054		10,974	54.3%
1983	4,781		5,368		621		9,528	56.3%
1984	5,581		8,960		711		13,830	64.8%
1985	5,518		12,922		849		17,591	73.5%
1986	5,901		13,882		862		18,921	73.4%
1987	6,409		10,187		1,122		15,474	65.8%
1988	7,035		11,007		1,598		16,444	66.9%
1989(r)	8,184		14,735		2,661		20,258	72.7%
1990(p)	7,965		11,301		2,789		16,477	68.6%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only. Data for production prior to 1986 does not include NC presses, forging machines, and "other" metal forming machine tools.



VALUE

(in millions of dollars)

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$350.7 E	$ 96.8	$85.1	$362.4 E	26.7% E
1982	247.5 E	79.9	30.2	297.2 E	26.9% E
1983	125.6	44.5	21.2	148.9	29.9%
1984	123.6	57.4	22.0	159.0	36.1%
1985	120.1	75.6	25.7	170.0	44.5%
1986	114.0	143.6	33.8	223.9	64.2%
1987	145.1	103.0	25.0	223.1	46.5%
1988	125.2	78.5	27.8	175.9	44.6%
1989(r)	174.2	131.2	32.5	272.8	48.1%
1990(p)	170.6	88.2	33.8	225.0	39.2%

UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	4,731 E	5,041	1,222	8,550 E	59.0% E
1982	2,475 E	4,245	536	6,184 E	68.6% E
1983	1,280	1,734	391	2,623	66.1%
1984	1,448	1,558	422	2,584	60.3%
1985	1,874	2,119	363	3,630	58.4%
1986	1,773	2,218	478	3,513	63.1%
1987	1,843	2,156	525	3,474	62.1%
1988	2,359	2,110	494	3,975	53.1%
1989(r)	3,132	2,608	1,004	4,736	55.1%
1990(p)	2,238	2,104	1,128	3,214	65.5%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed

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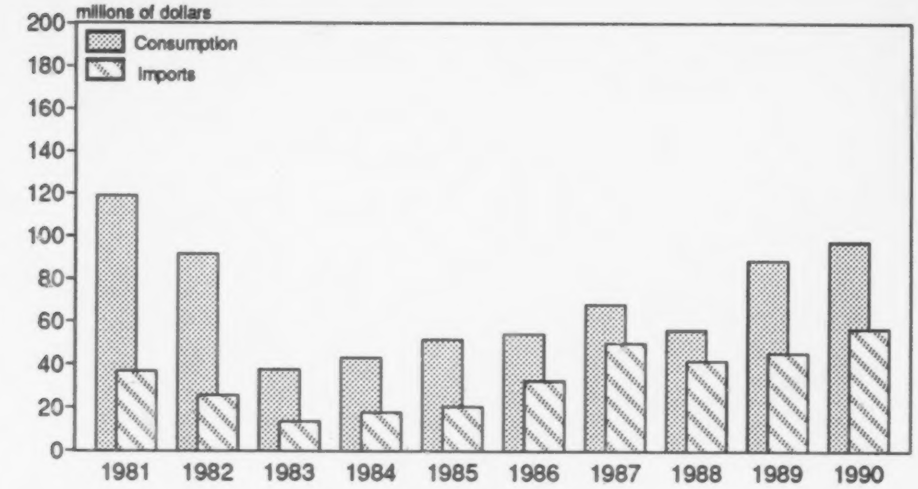


VALUE
(in millions of dollars)

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$133.1	$37.0	$51.1 E	$119.0 E	31.1%
1982	86.5	25.8	20.5 E	91.9 E	28.1%
1983	35.8	13.8	11.8	37.8	36.7%
1984	42.4	18.1	17.3	43.2	41.9%
1985	51.8	20.5	20.4	51.8	39.5%
1986	57.3	32.6	35.6	54.3	60.1%
1987	59.6	50.0	41.5	68.1	73.4%
1988	48.9	41.8	34.5	56.2	74.4%
1989(r)	97.3	45.5	53.9	88.9	49.8%
1990(p)	99.6 E	56.8	58.9	97.5 E	58.2% E

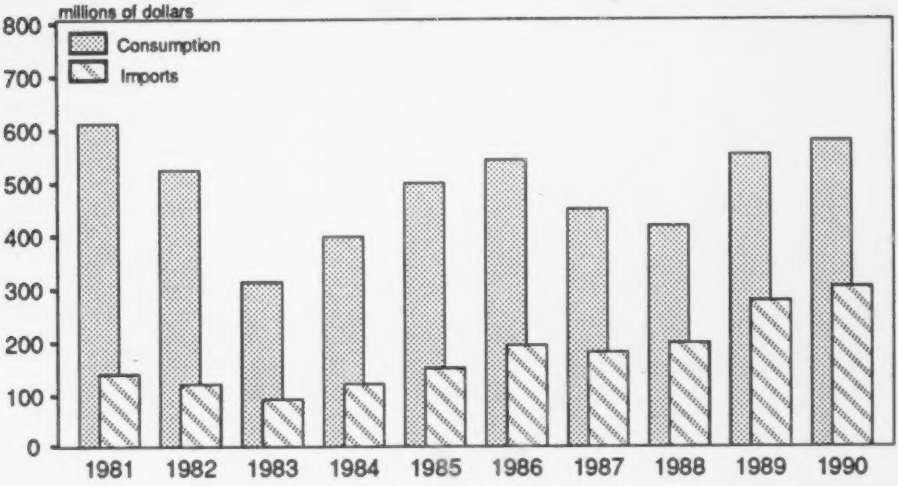
UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	837	367	371 E	833 E	44.1% E
1982	445	281	155 E	571 E	49.2% E
1983	158	153	65	246	62.2%
1984	199	328	84	443	74.0%
1985	243	301	105	439	68.6%
1986	253	557	235	575	96.9%
1987	204	509	198	515	98.8%
1988	164	658	236	586	112.3%
1989(r)	249	748	294	703	106.4%
1990(p)	236 E	526	256	506 E	104.0% E

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

Grinding



VALUE
(in millions of dollars)

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$597.5	$137.2	$126.5	$608.1	22.6%
1982	473.5	117.6	71.1	519.9	22.6%
1983	268.7	89.5	49.0	309.3	28.9%
1984	321.8	118.5	46.7	393.7	30.1%
1985	404.2	147.9	56.6	495.5	29.9%
1986	408.3	190.0	60.4	537.9	35.3%
1987	371.6	177.6	103.7	445.5	39.9%
1988(r)	344.7	194.7	125.8	413.6	47.1%
1989(r)	403.9	273.6	128.4	549.1	49.8%
1990(p)	404.9	300.1	130.6	574.4	52.2%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	14,861	5,334	2,694	17,501	30.5%
1982	9,711	4,530	1,877	12,364	36.6%
1983	6,352	3,282	930	8,704	37.7%
1984	8,575	5,249	999	12,825	40.9%
1985	9,160	6,746	1,365	14,541	46.4%
1986	7,907	6,611	1,164	13,354	49.5%
1987	7,214	5,885	1,901	11,198	52.6%
1988(r)	8,107	6,565	2,606	12,066	54.4%
1989(r)	7,692	8,105	3,956	11,841	68.4%
1990(p)	6,574	8,449	4,026	10,997	76.8%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed

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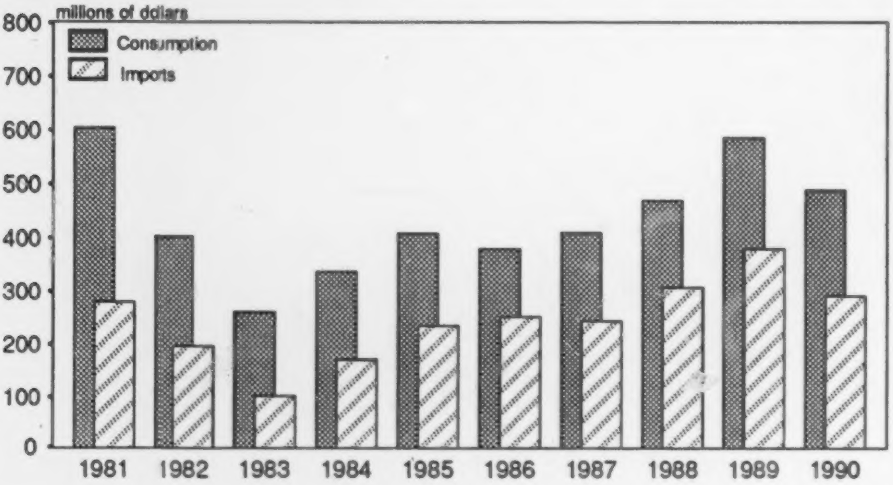

VALUE

(in millions of dollars)

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$346.6	$278.0	$20.4	$604.2	46.0%
1982	238.6	194.1	30.4	402.2	48.2%
1983	173.2	98.9	13.7	258.4	38.3%
1984	177.9	168.5	10.5	335.9	50.2%
1985	189.7	232.4	15.3	406.8	57.1%
1986	143.6	249.4	15.5	377.5	66.1%
1987	183.1	242.3	17.3	408.1	59.4%
1988(r)	194.4	304.9	31.2	468.1	65.1%
1989(r)	234.5	377.9	27.2	585.2	64.6%
1990(p)	242.4	289.6	43.9	488.1	59.3%

UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	1,784	3,508	165	5,127	68.4%
1982	1,295	2,490	215	3,570	69.7%
1983	1,103	1,609	132	2,580	62.4%
1984	1,332	2,758	114	3,976	69.4%
1985	1,344	3,986	138	5,192	76.8%
1986	1,071	4,986	168	5,889	84.7%
1987	1,530	3,696	161	5,065	73.0%
1988(r)	1,836	4,208	230	5,814	72.4%
1989(r)	2,130	4,139	246	6,023	68.7%
1990(p)	1,970	2,941	409	4,502	65.3%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

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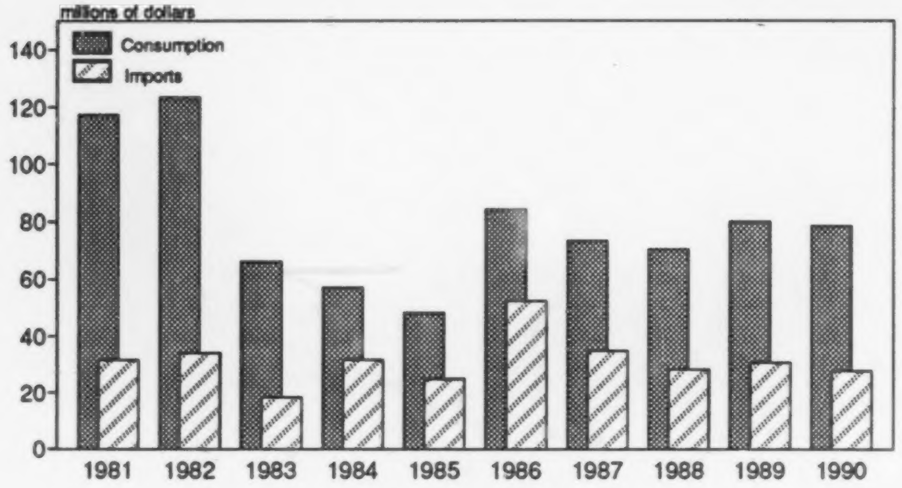
p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed



VALUE
(in millions of dollars)

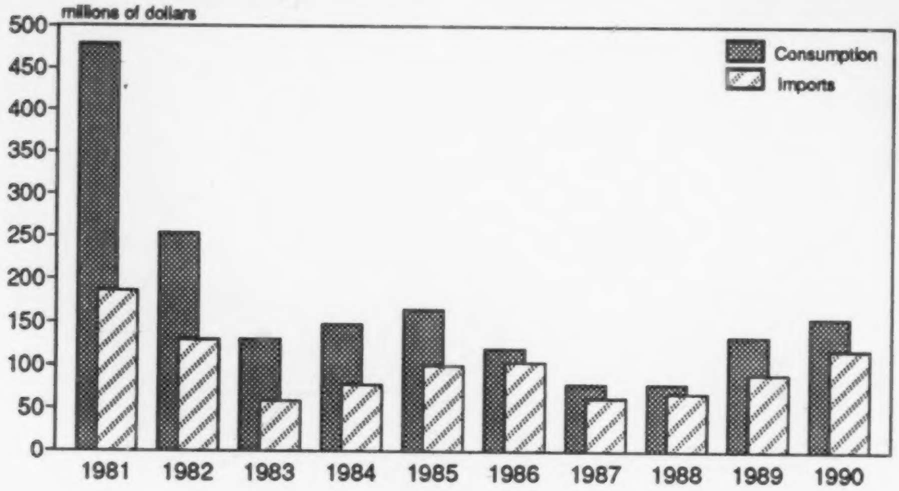
Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$94.8	$31.8	$ 9.1	$117.4	27.1%
1982	94.8	34.2	5.4	123.6	27.7%
1983	51.3	18.4	3.6	66.1	27.9%
1984	29.9	31.7	4.7	57.0	55.7%
1985	35.5	25.0	12.4	48.2	52.0%
1986	44.5	52.5	12.7	84.3	62.2%
1987	42.6	34.9	4.1	73.4	47.5%
1988	44.5	28.4	2.7	70.3	40.5%
1989(r)	52.2	30.8	2.8	80.1	38.4%
1990(p)	63.7	27.9	13.2	78.4	35.6%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	237	303	48	492	61.6%
1982	194	317	28	483	65.6%
1983	99	232	18	313	74.1%
1984	165	445	26	584	76.2%
1985	76	339	107	308	110.1%
1986	92	710	59	743	95.6%
1987	96	349	25	420	83.1%
1988	94	251	23	322	78.0%
1989(r)	96	156	20	232	84.3%
1990(p)	105	175	72	208	84.1%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE
(in millions of dollars)

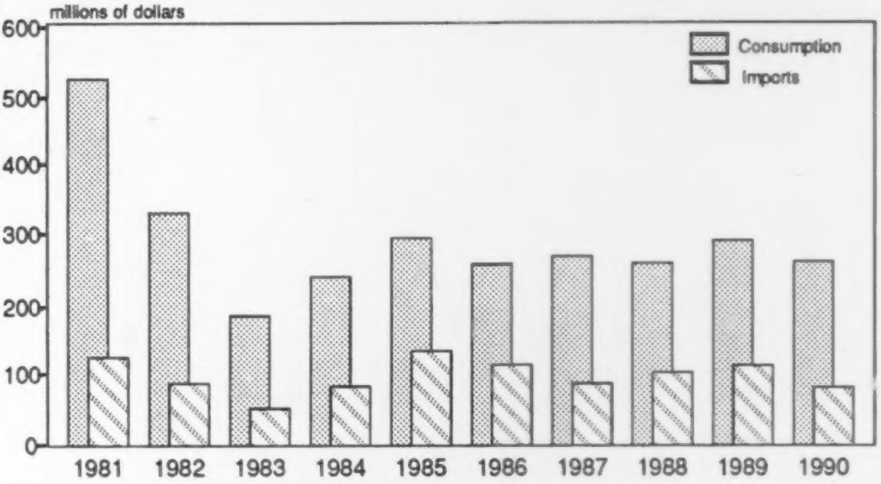
Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$372.4	$186.4	$79.3	$479.4	38.9%
1982	173.4	130.0	49.1	254.3	51.1%
1983	95.7	58.4	23.3	130.8	44.6%
1984	99.7	78.0	30.2	147.5	52.9%
1985	93.4	100.1	28.8	164.8	60.8%
1986	73.9	104.3	58.6	119.6	87.2%
1987	57.8	62.4	41.5	78.8	79.2%
1988	43.5	67.7	32.8	78.4	86.4%
1989(r)	56.5	90.3	13.1	133.7	67.5%
1990(p)	53.3	118.6	16.9	155.1	76.5%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	12,828	11,989	1,396	23,421	51.2%
1982	2,772	8,546	830	10,488	81.5%
1983	2,243	4,999	572	6,670	74.9%
1984	2,758	6,018	830	7,9[illegible]	75.7%
1985	2,400	7,780	866	9,314	83.5%
1986	1,874	6,359	2,063	6,170	103.1%
1987	1,413	4,529	991	4,951	91.5%
1988	1,387	5,021	895	5,513	91.1%
1989(r)	1,553	5,559	518	6,594	84.3%
1990(p)	1,166	8,388	790	8,764	95.7%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$435.6	$124.7	$37.8	$522.5	23.9%
1982	265.0	87.7	22.4	330.3	26.5%
1983	145.7	52.5	13.9	184.2	28.5%
1984	179.0	83.4	22.7	239.8	34.8%
1985	180.0	133.7	19.3	294.4	45.4%
1986	168.3	113.8	25.2	256.9	44.2%
1987	206.0	87.4	24.7	268.7	32.5%
1988	183.8	103.1	28.2	258.7	39.8%
1989(r)	205.0	112.5	27.2	290.3	38.7%
1990(p)	213.5	82.0	35.0	260.5	31.5%

UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	15,844	10,434	292	25,986	40.3%
1982	6,816	5,985	331	12,470	48.0%
1983	6,211	3,660	187	9,684	37.8%
1984	7,535	6,471	209	13,797	46.9%
1985	7,988	7,736	333	15,391	50.3%
1986	7,228	6,551	227	13,552	48.3%
1987	5,589	4,766	330	10,025	47.5%
1988	7,267	6,217	303	13,181	47.2%
1989(r)	6,072	6,182	521	11,733	52.7%
1990(p)	4,419	5,312	443	9,288	57.2%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed

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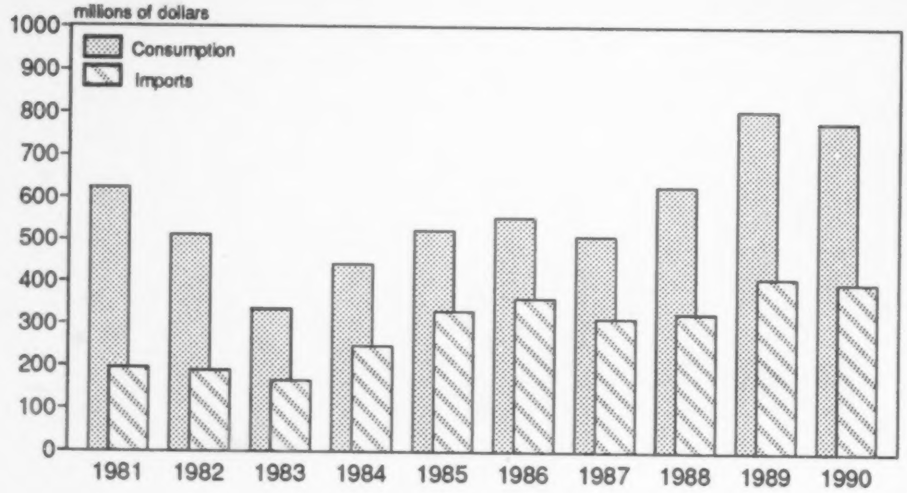


VALUE

(in millions of dollars)

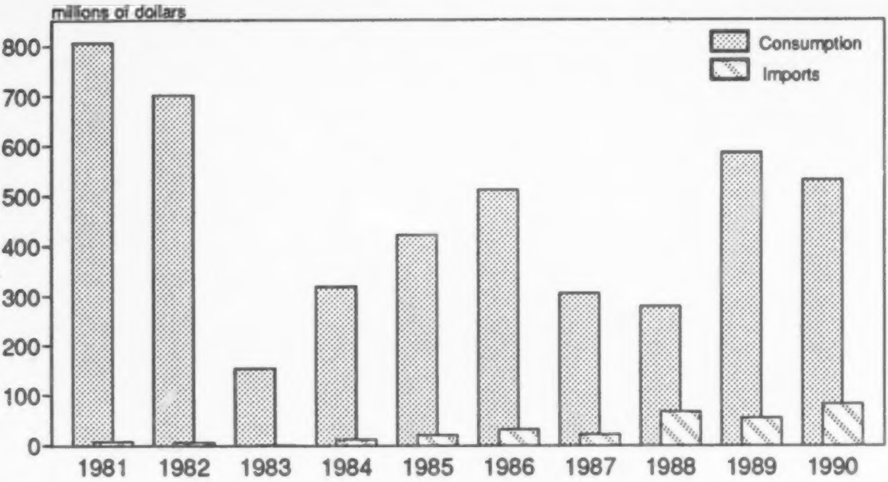
Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$482.7	$195.7	$53.4	$625.0	31.3%
1982	357.6	188.9	34.0	512.5	36.9%
1983	182.9	164.9	13.3	334.5	49.3%
1984	213.2	248.0	18.6	442.6	56.0%
1985	214.7	330.0	21.0	523.7	63.0%
1986	213.4	361.8	20.5	554.7	65.2%
1987	217.8	313.4	20.6	510.7	61.4%
1988(r)	334.5	326.3	30.8	629.9	51.8%
1989(r)	442.2	410.5	45.7	807.0	50.9%
1990(p)	437.4	399.9	56.6	780.7	51.2%

UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	2,081	2,007	316	3,772	53.2%
1982	1,396	1,873	195	3,074	60.9%
1983	1,005	1,936	102	2,839	68.2%
1984	1,237	2,911	117	4,031	72.2%
1985	1,077	4,188	156	5,109	82.0%
1986	918	4,037	131	4,824	83.7%
1987	1,361	2,914	202	4,073	71.5%
1988(r)	2,035	2,919	283	4,671	62.5%
1989(r)	2,557	3,810	380	5,987	63.6%
1990(p)	2,328	3,021	388	4,961	60.9%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE
(in millions of dollars)

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$896.1	$ 8.5	$97.2	$807.4	1.1%
1982	731.1	7.4	36.4	702.2	1.1%
1983	174.0	1.6	21.1	154.5	1.1%
1984	311.9	12.7	5.2	319.5	4.0%
1985	406.1	20.6	4.3	422.4	4.9%
1986	517.7	32.5	37.5	512.8	6.3%
1987	299.6	22.9	16.8	305.7	7.5%
1988	225.4	67.5	13.6	279.3	24.2%
1989(r)	562.9	55.0	31.7	586.2	9.4%
1990(p)	500.2	82.8	51.1	532.0	15.6%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	1,179	37	239	977	3.8%
1982	792	50	62	780	6.4%
1983	575	7	27	555	1.3%
1984	599	50	15	634	7.9%
1985	531	90	15	606	14.9%
1986	641	92	49	684	13.5%
1987	434	105	36	503	20.9%
1988	283	184	34	433	42.5%
1989(r)	508	193	56	645	29.9%
1990(p)	412	172	82	502	34.3%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed

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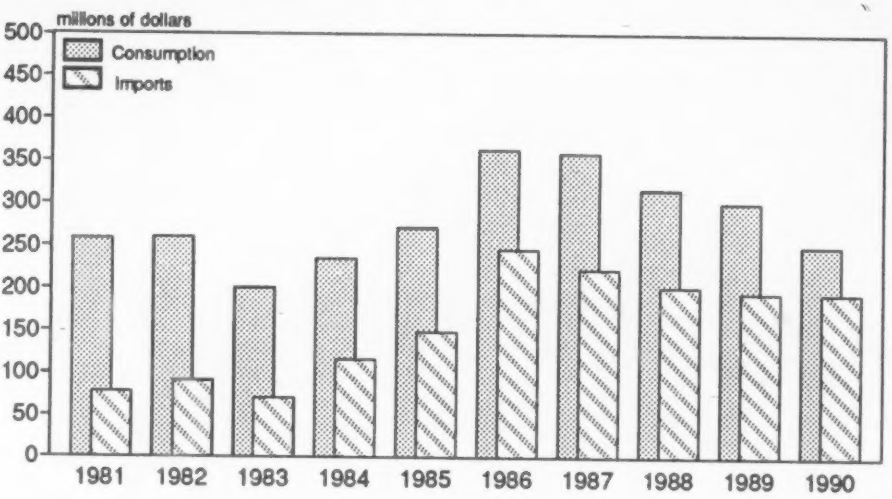


VALUE

(in millions of dollars)

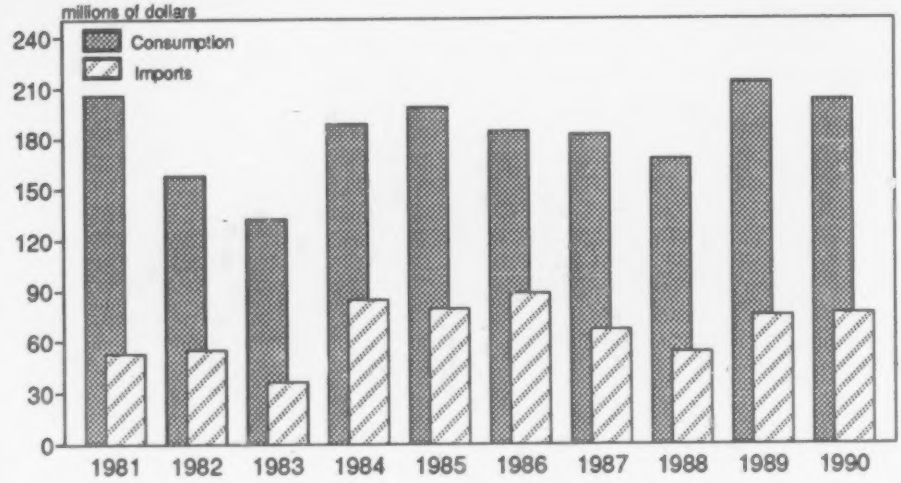
Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$269.6	$78.6	$89.5 E	$258.7 E	30.4% E
1982	231.4	91.2	62.3 E	260.3 E	35.0% E
1983	179.3	70.9	49.3	201.0	35.3%
1984	154.7	116.7	36.1	235.3	49.6%
1985	151.3	149.1	28.9	271.5	54.9%
1986	139.6	246.2	22.4	363.4	67.7%
1987	165.4	222.9	29.0	359.3	62.0%
1988(r)	153.6	202.2	39.4	316.4	63.9%
1989(r)	162.4	195.8	57.3	300.8	65.1%
1990(p)	134.3	194.4	78.4	250.3	77.7%

UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	11,694	2,864	2,489	12,069	23.7%
1982	9,164	2,335	1,502	9,997	23.4%
1983	8,062	2,367	1,018	9,411	25.2%
1984	7,893	3,919	1,075	10,737	36.5%
1985	6,732	4,897	983	10,646	46.0%
1986	6,234	5,083	810	10,507	48.4%
1987	5,765	4,446	982	9,229	48.2%
1988(r)	6,913	6,116	1,537	11,492	53.2%
1989(r)	7,577	4,950	2,440	10,087	49.1%
1990(p)	6,971	4,795	4,077	7,689	62.4%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	$198.1	$52.9	$44.9	$206.1	25.7%
1982	136.5	54.8	32.9	158.3	34.6%
1983	114.2	36.4	18.1	132.5	27.5%
1984	126.6	84.8	22.6	188.7	44.9%
1985	137.4	79.4	18.1	198.6	40.0%
1986	117.6	88.4	21.8	184.1	48.0%
1987	137.7	67.1	22.5	182.3	36.8%
1988	162.3	53.6	48.3	167.7	32.0%
1989(r)	195.4	75.3	57.4	213.3	35.3%
1990(p)	191.5	76.5	65.4	202.6	37.7%

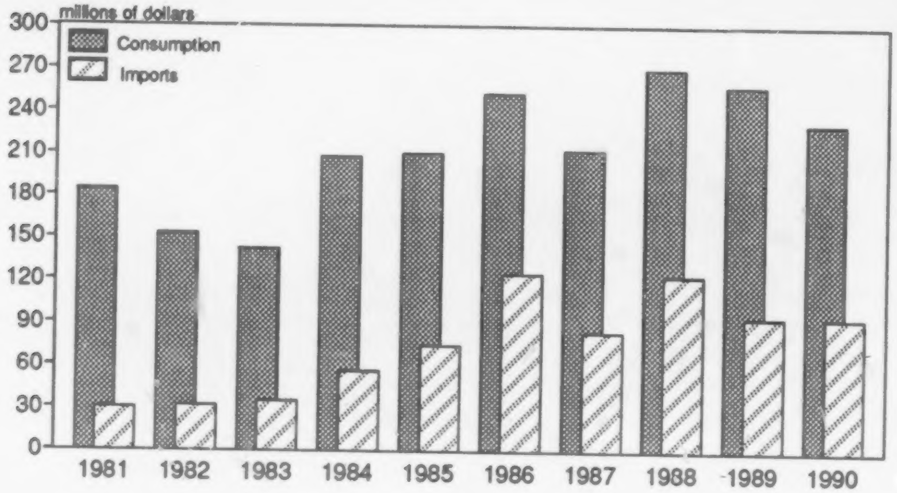
UNITS

Year	Shipments +	Imports −	Exports =	U.S. Consumption	% Import Penetration
1981	5,423	1,660	1,195	5,888	28.2%
1982	3,736	1,523	780	4,479	34.0%
1983	2,784	1,263	575	3,472	36.4%
1984	3,164	1,987	569	4,582	43.4%
1985	3,548	2,243	596	5,195	43.2%
1986	3,427	2,248	570	5,105	44.0%
1987	3,518	1,616	757	4,377	36.9%
1988	4,153	1,505	1,333	4,325	34.8%
1989(r)	4,250	1,800	1,267	4,783	37.6%
1990(p)	4,710	1,643	1,569	4,784	34.3%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

Bending and Forming



VALUE
(in millions of dollars)

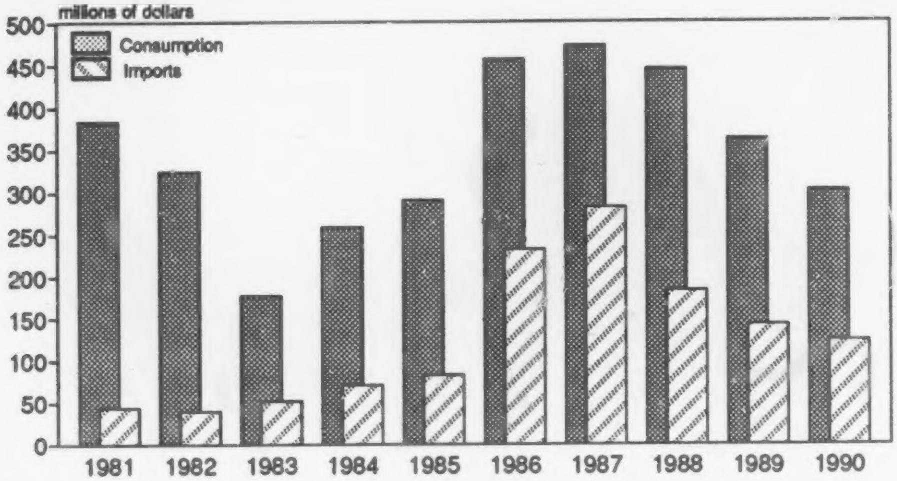
Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$200.5	$30.1	$46.0	$184.6	16.3%
1982	156.5	31.7	35.1	153.2	20.7%
1983	127.0	34.9	19.7	142.2	24.5%
1984	171.2	56.2	19.4	208.1	27.0%
1985	166.7	74.2	30.3	210.6	35.2%
1986	162.0	125.0	33.9	253.2	49.4%
1987	162.6	83.8	33.3	213.0	39.3%
1988	196.0	123.7	49.1	270.7	45.7%
1989(r)	211.1	94.4	46.7	258.8	36.5%
1990(p)	211.5	94.0	73.7	231.8	40.5%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	7,472	1,597	1,188	7,881	20.3%
1982	5,990	1,361	807	6,544	20.8%
1983	5,958	1,502	457	7,003	21.4%
1984	6,295	2,288	586	7,997	28.6%
1985	7,042	2,995	698	9,339	32.1%
1986	6,584	3,027	707	8,904	34.0%
1987	6,935	2,243	859	8,319	27.0%
1988	6,794	2,226	1,247	7,773	28.6%
1989(r)	6,643	2,513	1,019	8,137	30.9%
1990(p)	6,361	2,169	1,859	6,671	32.5%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

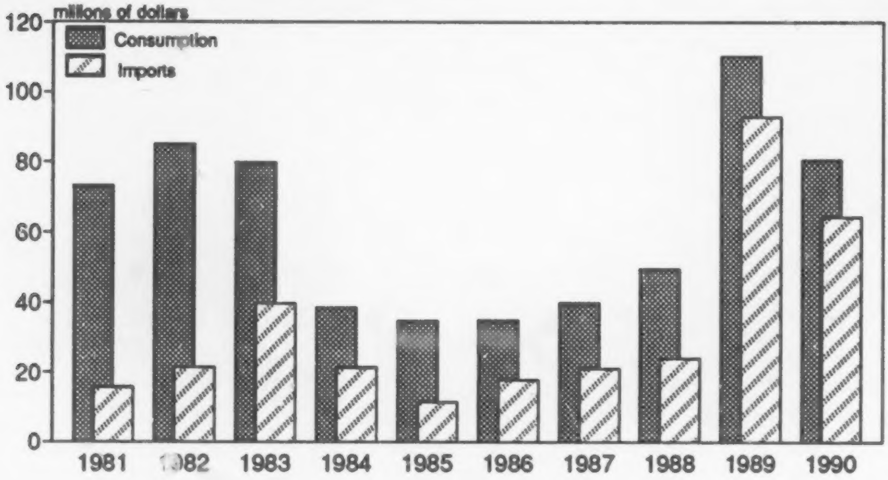
Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$418.6	$44.3	$79.4	$383.6	11.6%
1982	338.3	40.3	53.8	324.8	12.4%
1983	156.1	52.2	30.0	178.4	29.3%
1984	224.9	70.6	36.0	259.4	27.2%
1985	250.0	83.0	41.7	291.3	28.5%
1986	288.1	232.9	63.5	457.5	50.9%
1987	261.7	282.7	71.1	473.3	59.7%
1988	351.2	183.6	89.2	445.6	41.2%
1989(r)	313.1	142.8	92.4	363.5	39.3%
1990(p)	278.0	124.0	99.2	302.8	40.9%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	4,123	609	1,163	3,569	17.1%
1982	3,147	526	686	2,987	17.6%
1983	2,419	556	433	2,542	21.9%
1984	2,672	875	622	2,925	29.9%
1985	2,611	1,076	964	2,723	39.5%
1986	2,685	1,411	915	3,181	44.4%
1987	2,549	2,186	1,070	3,665	59.6%
1988	3,021	1,434	1,542	2,913	49.2%
1989(r)	3,439	1,971	1,644	3,766	52.3%
1990(p)	3,015	3,527	2,032	4,510	78.2%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

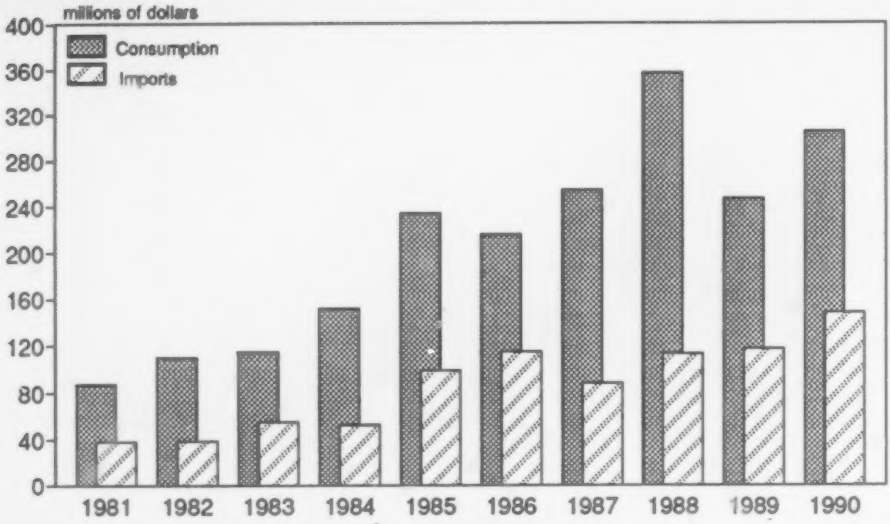
Year	Shipments	+	Imports	–	Exports	=	U.S. Consumption	% Import Penetration
1981	$79.0		$15.8		$21.3		$73.4	21.5%
1982	79.0		21.5		15.3		85.2	25.3%
1983	48.0		39.8		7.9		79.9	49.8%
1984	29.0		21.4		11.8		38.6	55.3%
1985	35.4		11.5		12.2		34.7	33.3%
1986	36.7		17.9		19.7		34.9	51.2%
1987	42.7		21.1		23.9		39.9	52.8%
1988	52.5 E		24.2		27.1		49.7 E	48.8% E
1989(r)	58.5 E		93.1		41.1		110.5 E	84.3% E
1990(p)	67.5 E		64.5		51.2		80.8 E	79.8% E

UNITS

Year	Shipments	+	Imports	–	Exports	=	U.S. Consumption	% Import Penetration
1981	479		196		256		419	46.8%
1982	383		207		190		400	51.8%
1983	263		121		132		252	48.0%
1984	198		288		140		346	83.2%
1985	213		270		183		300	90.0%
1986	142		253		164		231	109.5%
1987	184		303		280		207	146.4%
1988	225 E		215		265		175 E	122.9% E
1989(r)	228 E		1,554		802		980 E	158.6% E
1990(p)	202 E		988		360		830 E	119.0% E

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.



VALUE

(in millions of dollars)

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	$132.6	$38.3	$83.1	$ 87.8	43.6%
1982	128.7	39.0	57.6	110.1	35.4%
1983	108.6	55.6	49.1	115.1	48.3%
1984	156.3	52.8	57.2	151.9	34.8%
1985	187.3	99.0	52.1	234.2	42.3%
1986	170.7	114.8	69.8	215.7	53.2%
1987	258.6	88.4	92.7	254.4	34.7%
1988(r)	334.5	113.2	90.4	357.2	31.7%
1989(r)	284.3	117.7	154.7	247.2	47.6%
1990(p)	257.7	148.4	100.6	305.6	48.6%

UNITS

Year	Shipments +	Imports –	Exports =	U.S. Consumption	% Import Penetration
1981	4,408	1,088	1,328	4,168	26.1%
1982	4,825	1,017	823	5,019	20.3%
1983	4,687	1,443	615	5,515	26.2%
1984	5,395	1,917	743	6,569	29.2%
1985	5,269	2,248	730	6,787	33.2%
1986	5,152	2,865	688	7,329	39.1%
1987	4,393	2,272	1,130	5,535	41.0%
1988(r)	6,354	3,111	1,440	8,025	38.8%
1989(r)	5,988	5,747	3,814	7,921	72.6%
1990(p)	5,692	2,801	3,053	5,440	51.5%

Source: U.S. Department of Commerce

Note: Data includes machines valued over $2,500 only.

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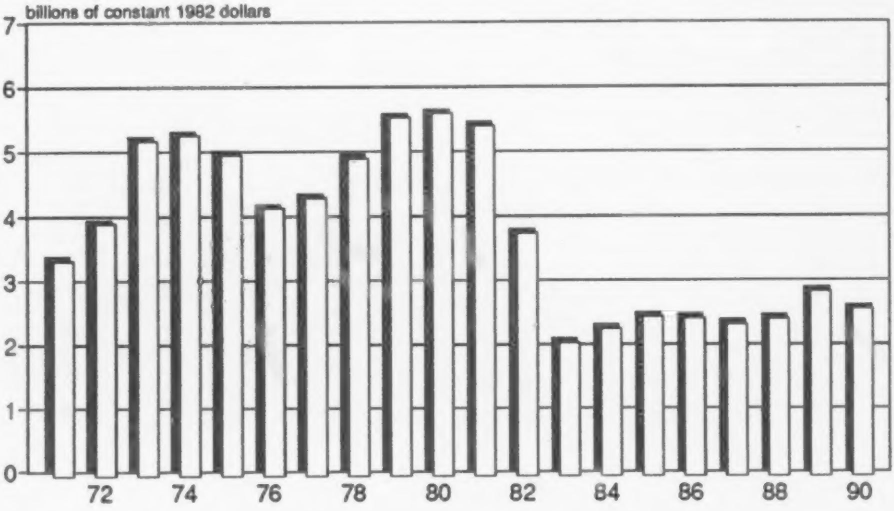
(in millions of dollars)

	Total Shipments		Machines Valued $2,500 or More		Machines Valued Less Than $2,500	
Year	Units	Value	Units E	Value E	Units E	Value E
1981	301,313	$5,111.3	87,981	$5,007.8	213,332	$103.4
1982	178,638	3,804.3	53,141	3,738.4	125,497	65.9
1983	150,837	2,144.8	43,199	1,986.2	107,638	58.7
1984	162,438	2,426.4	49,511	2,362.3	112,927	64.1
1985	147,147	2,682.2	50,108	2,623.6	97,039	58.6
1986	134,485	2,709.8	45,589	2,655.6	88,896	54.2
1987	141,120	2,668.7	43,028	2,612.1	98,092	56.6
1988(r)	160,032	2,858.2	50,992	2,795.2	109,040	63.0
1989(r)	150,938	3,514.2	52,114	3,453.4	98,824	60.8
1990(p)E	133,863	3,388.3	46,399	3,326.0	87,464	62.3



Constant Dollar Table, Total Shipments

(in millions of 1982 dollars)

Year	Units	Value	Year	Units	Value
1971	211,432	$3,379.8	1981	301,313	$5,455.4
1972	267,065	3,954.2	1982	178,638	3,804.3
1973	307,680	5,227.6	1983	150,837	2,096.6
1974	337,799	5,308.9	1984	162,438	2,319.7
1975	280,341	5,012.7	1985	147,147	2,502.1
1976	270,875	4,189.0	1986	134,485	2,477.0
1977	284,583	4,350.0	1987	141,120	2,387.1
1978	327,460	4,956.8	1988(r)	160,032	2,470.1
1979	345,218	5,582.5	1989(r)	150,938	2,887.3
1980	323,899	5,648.3	1990(p)	133,863	2,617.3

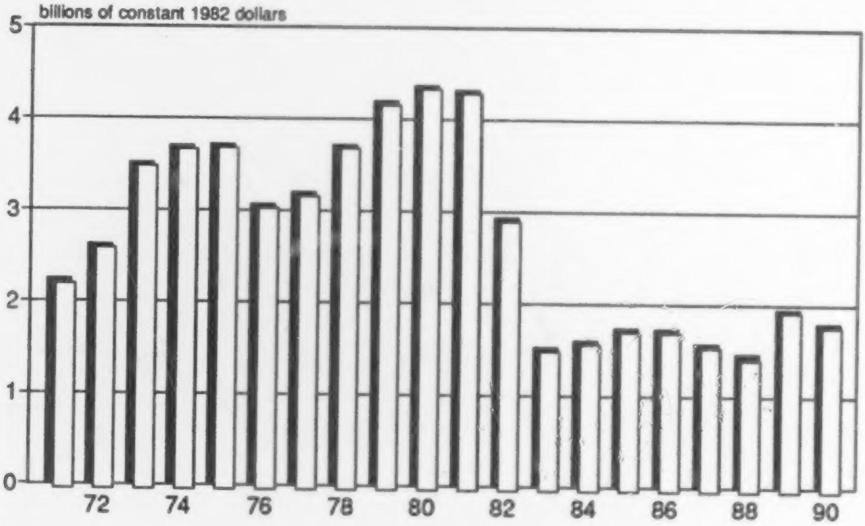
Source: U.S. Department of Commerce

U.S. MACHINE TOOL SHIPMENTS

Metal Cutting

(in millions of dollars)

Year	Total Shipments Units	Total Shipments Value	Machines Valued $2,500 or More Units E	Machines Valued $2,500 or More Value E	Machines Valued Less Than $2,500 Units E	Machines Valued Less Than $2,500 Value E
1981	234,647	$4,046.9	66,076	$3,979.0	168,571	$68.0
1982	130,434	2,940.6	35,060	2,899.4	95,374	41.2
1983	100,764	1,564.2	27,088	1,532.2	73,676	32.0
1984	105,740	1,688.3	31,737	1,654.3	74,003	34.0
1985	93,802	1,877.3	31,425	1,846.8	62,377	30.4
1986	89,565	1,911.6	27,677	1,880.5	61,888	31.1
1987	92,711	1,780.7	25,449	1,748.7	67,262	32.0
1988(r)	104,776	1,734.8	30,445	1,698.6	74,331	36.2
1989(r)	103,576	2,428.5	31,566	2,391.1	72,010	37.4
1990(p)	89,850	2,351.8	26,419	2,319.8	63,431	32.0



Constant Dollar Table, Total Shipments

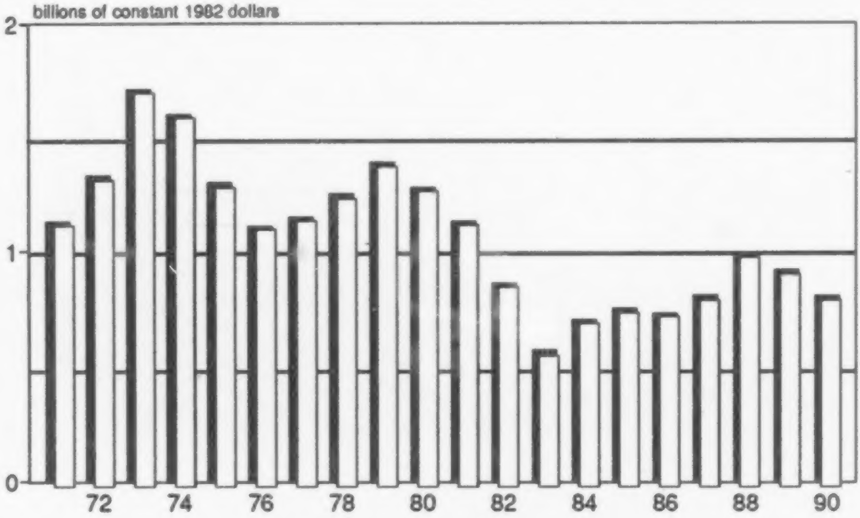
(in millions of 1982 dollars)

Year	Units	Value	Year	Units	Value
1971	157,099	$2,246.7	1981	234,647	$4,323.7
1972	207,290	2,631.8	1982	130,434	2,940.6
1973	252,237	3,519.3	1983	100,764	1,532.0
1974	272,811	3,702.9	1984	105,740	1,614.0
1975	229,169	3,722.2	1985	93,802	1,749.6
1976	212,757	3,073.8	1986	89,565	1,744.2
1977	220,017	3,198.7	1987	92,711	1,581.4
1978	257,647	3,717.2	1988(r)	104,776	1,477.7
1979	263,019	4,195.0	1989(r)	103,576	1,968.0
1980	248,563	4,367.1	1990(p)	89,850	1,811.9

Source: U.S. Department of Commerce

(in millions of dollars)

Year	Total Shipments Units	Total Shipments Value	Machines Valued $2,500 or More Units	Machines Valued $2,500 or More Value	Machines Valued Less Than $2,500 Units	Machines Valued Less Than $2,500 Value
1981	66,666	$1,064.3	21,905	$1,028.9	44,761	$35.4
1982	48,204	863.6	18,081	839.0	30,123	24.7
1983	50,073	580.6	16,111	554.0	33,962	26.6
1984	56,698	738.1	17,774	708.0	38,924	30.1
1985	53,345	804.9	18,683	776.7	34,662	28.2
1986	44,920	798.2	17,912	775.1	27,008	22.1
1987	48,409	887.9	17,579	863.4	30,830	24.5
1988	55,256	1,123.4	20,547	1,096.6	34,709	26.8
1989(r)	47,362	1,085.7	20,548	1,062.3	26,814	23.4
1990(p)	44,013	1,036.5	19,980	1,006.2	24,033	30.3



Constant Dollar Table, Total Shipments

(in millions of 1982 dollars)

Year	Units	Value	Year	Units	Value
1971	54,333	$1,129.7	1981	66,666	$1,132.2
1972	59,775	1,327.1	1982	48,204	863.6
1973	55,443	1,711.7	1983	50,073	565.4
1974	64,988	1,600.9	1984	56,698	705.0
1975	51,172	1,296.3	1985	53,345	752.3
1976	58,118	1,114.2	1986	44,920	734.3
1977	64,566	1,151.5	1987	48,409	805.7
1978	69,813	1,245.3	1988	55,256	992.4
1979	82,199	1,385.8	1989(r)	47,362	919.3
1980	75,336	1,278.9	1990(p)	44,003	805.4

Source: U.S. Department of Commerce

p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed

U.S. MACHINE TOOL SHIPMENTS

Numerically Controlled

(values in millions of dollars)

Year	TOTAL Units	TOTAL Value	METAL CUTTING Units	METAL CUTTING Value	METAL FORMING Units	METAL FORMING Value
1981	D	D	7,737	$1,370.8	D	D
1982	D	D	4,962	1,067.3	D	D
1983	D	D	4,224	625.3	D	D
1984	D	D	4,921	650.3	D	D
1985	D	D	4,953	717.0	D	D
1986	5,901	$843.5	4,793	735.5	1,108	$108.0
1987	6,049	931.0	5,291	811.2	1,118	119.8
1988(r)	7,035	991.9	5,662	852.3	1,373	139.6
1989(r)	8,184	1,263.4	6,757	1,090.0	1,427	173.4
1990(p)	7,965	1,364.9	6,245	1,178.8	1,720	186.1

Metal Cutting

Year	BORING & DRILLING MACHINES Units	BORING & DRILLING MACHINES Value	LATHES Units	LATHES Value	GRINDING & POLISHING MACHINES Units	GRINDING & POLISHING MACHINES Value
1981	748	$173.0	2,021	$441.4	645	$46.7
1982	231	110.7	1,489	332.8	590	49.6
1983	69	37.1	1,202	224.6	494	42.7
1984	119	45.1	1,497	207.8	546	65.9
1985[1]	89	35.4	1,420	225.2	724	122.4
1986	117	45.9	1,167	188.1	809	144.1
1987[1]	D	D	1,626	225.6	765	135.7
1988(r)	101	42.0	1,930	239.0	688	105.8
1989(r)	133	58.7	2,226	286.7	802	151.5
1990 (p)	133	68.5	2,075	306.1	783	179.3

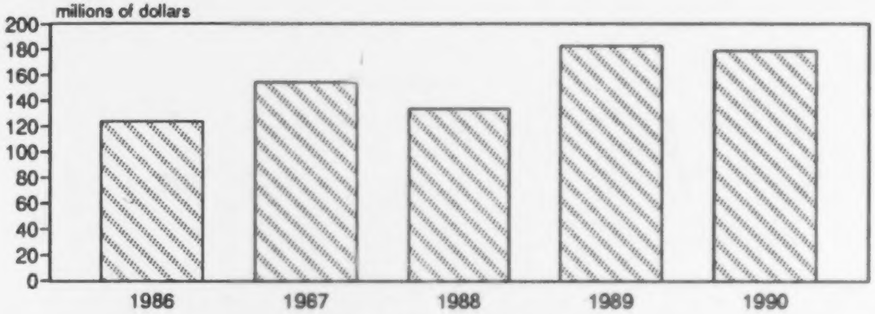
Year	MILLING MACHINES Units	MILLING MACHINES Value	MACHINING CENTERS Units	MACHINING CENTERS Value	OTHER METAL CUTTING MACHINES Units	OTHER METAL CUTTING MACHINES Value
1981	1,763	$190.6	2,081	$482.7	479	$36.4
1982	1,061	185.6	1,396	357.6	140	31.0
1983	1,091	108.9	1,005	182.9	363	29.1
1984	1,434	108.9	1,237	213.2	88	9.4
1985	1,087	99.6	1,077	214.7	556	19.7
1986	1,282	114.2	918	213.4	486	29.8
1987	818	113.2	1,361	217.8	721	118.9
1988(r)	654	84.3	2,035	334.5	254	46.7
1989(r)	769	109.2	2,557	442.2	270	41.7
1990(p)	685	153.8	2,328	437.4	241	33.7

Metal Forming

Year	PUNCHING, SHEARING, BENDING & FORMING Units	PUNCHING, SHEARING, BENDING & FORMING Value	OTHER METAL FORMING MACHINES Units	OTHER METAL FORMING MACHINES Value
1981	1,208	$ 96.5	D	D
1982	1,104	59.3	D	D
1983	557	51.9	D	D
1984	660	89.2	D	D
1985	565	75.0	D	D
1986	537	72.3	571	$35.7
1987	527	87.7	591	32.1
1988	738	107.6	635	32.0
1989(r)	907	125.3	520	48.1
1990(p)	982	135.1	738	51.0

Source: U.S. Department of Commerce

Note: [1] "Drilling Machines" are included in the "Other Metal Cutting Machines" category.



(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988r)	1989(r)	1990(p)
Boring and Drilling Mach.	8,515	7,708	10,236	10,508	9,049	$123.9	$154.7	$133.9	$183.2	$179.4
Boring Mach. valued under $2,500	—	—	—	—	—	—	—	—	—	—
Horiz. Boring, Drilling & Milling Mach.:										
Table Type	D	29	D	57	D	D	18.8	D	26.6	D
Floor Type										
Precision Boring Machines	431	474	422	524	514	62.1	84.3	68.6	89.8	91.8
Jig Boring Machines	D	15	D	D	—	D	3.8	D	D	—
All Other Boring Machines	D	—	—	—	—	D	—	—	—	—
Drilling Mach. valued under $2,500	6,742	5,865	7,877	7,376	6,811	9.9	9.5	8.6	9.0	8.9
Vertical Drilling Machines	291	326	713	957	754	3.3	3.2	3.9	5.2	4.3
Radial Drilling Machines	125	123	D	99	D	8.7	9.7	D	12.9	D
Deep Hole Drilling Machines					104					16.3
Multiple Spindle Drilling Machines:										
Adjustable Joint, Fixed Center	752	650	661	876	395	12.0	18.7	14.4	16.9	8.3
Automatic Drilling	121	129	105	173	159	6.1	6.7	6.4	7.2	9.0
All Other			D	D	D			D	D	D

Source: U.S. Department of Commerce
Note: r – revised, p – preliminary, D – not disclosed

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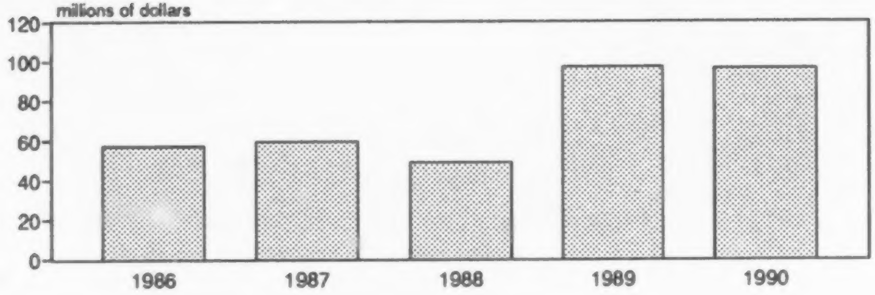

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989(r)	1990(p)	1986	1987	1988	1989(r)	1990(p)
Gear Cutting Machines	253	204	164	249	236 E	$57.3	$59.6	$48.9	$97.3	$99.6 E
Gear Tooth Finishing Machines[1] Gear Hobbers–Horiz. and Vertical[2]	253	204	164	249	236 E	57.3	59.6	48.9	97.3	99.6 E

Source: U.S. Department of Commerce

Note: [1]Includes bevel gear generators, [2]Includes gear shapers, r – revised, p – preliminary, E – estimated by NMTBA

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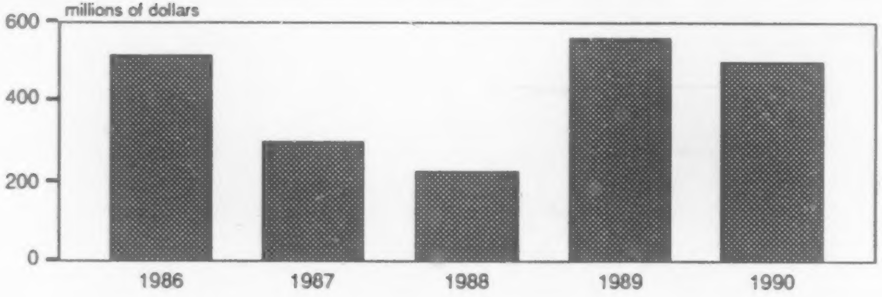
U.S. MACHINE TOOL SHIPMENTS

Station–type Machines



(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989(r)	1990(p)	1986	1987	1988	1989(r)	1990(p)
Station–Type Machines	641	434	283	508	412	$517.7	$299.6	$225.4	$562.9	$500.2
Dial or rotary, trunnion, & cen. column Way type	298	287	188	274	265	132.1	125.3	85.3	152.7	189.0
Transfer	213	94	63	234	147	322.8	144.6	128.4	410.2	311.2
Other Station Type	130	53	32			62.8	29.6	11.7		

Source: U.S. Department of Commerce

Note: r – revised, p – preliminary

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Grinding and Polishing Machines

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(r)	1990(p)
All Grinding and Polishing Machines	54,534	59,897	63,283	60,157	54,287	$419.7	$384.7	$359.8	$419.8	$418.9
Unit Value Under $2,500	46,627	52,683	55,176	52,465	47,113	11.4	13.1	15.1	15.9	13.9
Unit Value $2,500 and Over	7,907	7,214	8,107	7,692	7,174	408.3	371.6	344.7	403.9	404.9
External Cylindrical Grinding Machines:										
Plain	77	78	85	76	86	21.7	20.1	21.2	25.8	31.2
Universal	151	103	119	58	D	12.1	6.6	8.8	7.2	D
Roll Centerless Chucking All Other External[1]	513	575	495	504	410	85.0	76.1	53.2	60.5	80.9
Internal Cylindrical Grinding Machines	D	D	D	D	D	D	D	D	D	D
Surface Grinding Machines:										
Rotary Table Type	84	71	65	280	273	16.4	16.6	13.0	22.7	21.2
Reciprocating Table Type:										
Vertical and Horizontal	619	421	686	605	514	16.5	13.3	20.6	21.1	20.6
Hand Surface Type	1,303	878	811	778	700 E	9.2	8.9	6.5	4.7	5.5 E
All other surface grinding machines	D	D	D	D	D	D	D	D	D	D
Disc Grinders, Double Spindle	D	D	D	D	D	D	D	D	D	D
All other disc grinders, bench, floor, snag grinders and abrasive belt grinders	322	320	265	260	208	8.4	12.1	7.5	7.6	6.3
Tool and Cutter Grinding Machines	1,439	782	981	1,001	649	58.6	43.5	57.7	70.1	38.1
All other grinding machines	613	980	1,116	990	992	29.3	28.7	43.0	40.8	37.4
Honing and Lapping Machines, internal, incl. combination bore, hone, and external	1,004	1,129	D	1,306	D	39.6	D	D	36.8	D
Flat surface lapping, except gear lapping	170	187	230	220	250 E	6.2	8.6	12.4	5.7	11.9 E
All other honing and lapping	D	D	D	D	D	D	D	D	D	D
Polishing stands, abrasive belt drum and disc	310	333	D	D	D	6.0	D	D	D	D
All other polishing and buffing machines, including speed lathes and multistation type	947	1,061	1,212	1,163	755	31.2	24.0	25.0	33.5	24.7

Source: U.S. Department of Commerce

Note: [1] Includes chucking grinders, r – revised, p – preliminary, E – estimated by NMTBA

See graph next page.

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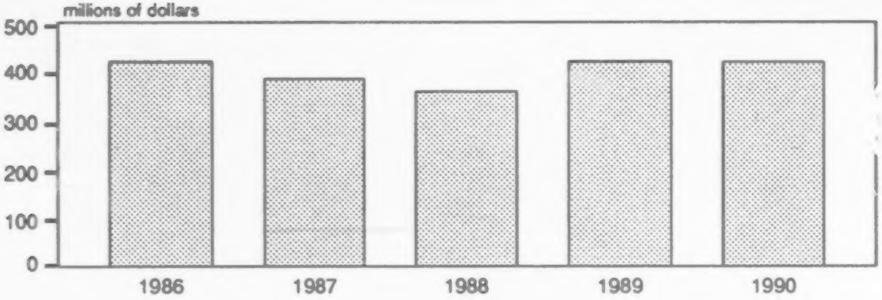
U.S. MACHINE TOOL SHIPMENTS

Grinding and Polishing Machines



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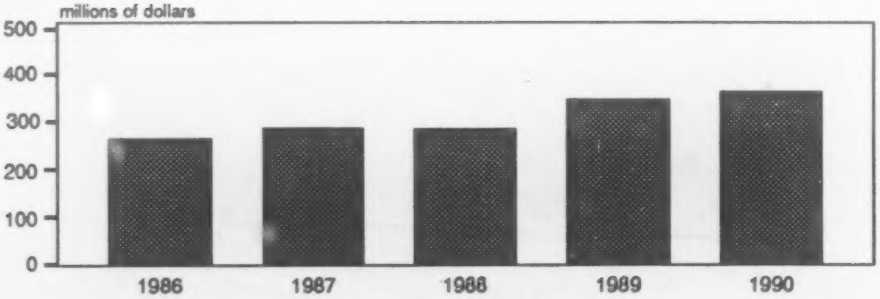
U.S. MACHINE TOOL SHIPMENTS

Lathes



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U.S. MACHINE TOOL SHIPMENTS

Lathes

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(r)	1990(p)
Lathes (or Turning Machines)	3,057	3,045	3,317	3,789	3,257	$262.0	$283.5	$282.5	$343.2	$359.4
Horizontal NC Turning Machines	1,071	1,530	1,836	2,130	1,970	143.6	183.1	194.4	234.5	242.4
Multiple Spindle	—	—	—	(a)	(a)	—	—	—	(a)	(a)
Single Spindle:										
Small	891	1,352	1,687	1,785	1,584	105.9	120.0	152.1	153.5	144.2
Medium	112	96	100	302	298	20.5	24.1	17.7	68.8	64.3
Large	68	82	49	43	88	17.1	38.9	24.6	12.2	33.8
Vertical NC Turning Machines	92	96	94	96	105	44.5	42.6	45.5	52.2	63.7
Vertical turret lathe and vertical boring machine over 30" diameter table	92	96	94	96	105	44.5	42.6	45.5	52.2	63.7
Vertical multiple spindle machines										
All other vertical turning machines										
Non–Numerically Controlled Turning Machines	1,894	1,419	1,387	1,563	1,182	73.9	57.9	43.5	56.6	53.3
All lathes valued at under $2,500	D	D	D	D	D	D	D	D	D	D
Engine or toolroom lathes swing over cross slide:										
8" or less	716	592	539	582	454	12.5	12.0	10.4	14.7	13.3
8"–16"										
Over 16"	152					6.9				
All other engine or toolroom lathes										
Automatic Lathes:										
Single Spindle	D	D	D	51	D	D	D	D	3.4	D
Multiple Spindle:										
Bar (screw) machines	189	D	D	267	177	18.8	D	D	24.2	22.5
Chucking machines	D	D	D	D	D	D	D	D	D	D
All other horizontal turning machines	D	311	261	302	D	D	17.4	6.8	5.7	D
Vertical turret lathes and vertical boring machines	—	D	—	—	—	—	D	—	—	—
All other vertical turning machines	D	D	D	D	D	D	D	D	D	D

Source: U.S. Department of Commerce

See graph previous page.

Note: (a) – included in large single spindle to avoid disclosure, r – revised, p – preliminary, D – not disclosed

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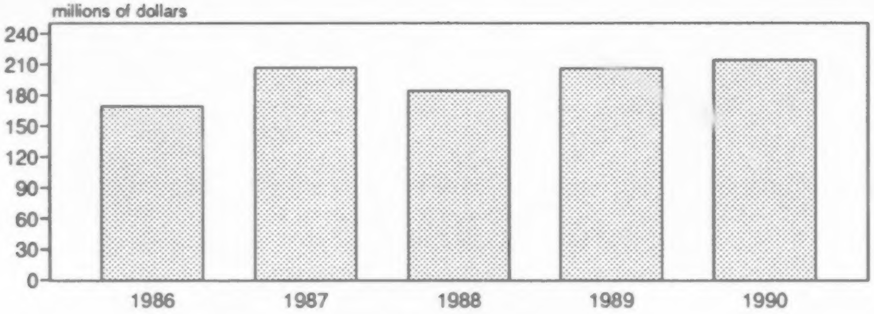

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(r)	1990(p)
Milling Machines	8,133	6,277	7,717	6,872	4,789	$169.2	$206.9	$184.5	$206.2	$214.3
Milling Machines valued under $2,500 (E)	617	688	450	800	370	1.0	1.0	0.7	1.2	0.8
Milling Machines valued over $2,500 (E)	7,516	5,589	7,267	6,072	4,419	168.3	206.0	183.8	205.0	213.5
General Purpose, Knee or Bed:										
Horizontal, Plain, Universal, and Ram	D	D	D	D	D	D	D	D	D	D
Vertical, except Ram										
Vertical Ram										
All Other General Purpose Milling Machines										
Automatic and manufacturing:										
Single spindle	175	D	D	D	D	7.5	D	D	D	D
Multiple spindle and special purpose machines	D	437	D	D	D	D	19.6	D	D	D
Profile machines and duplicators	203	175	162	149	121	77.7	132.2	87.3	81.1	128.4
Die Sinking and engraving machines										
All Other Milling Machines										

Source: U.S. Department of Commerce
Note: p – preliminary, r – revised,, E – estimated by NMTBA D – not disclosed

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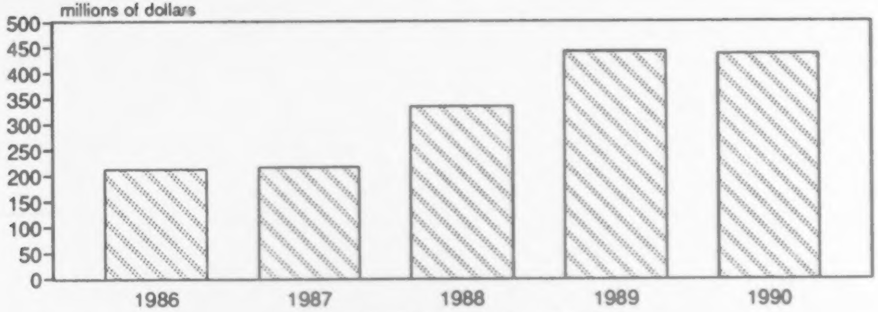

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(r)	1990(p)
Machining Centers	936	1,361	2,035	2,557	2,328	$213.4	$217.8	$334.5	$442.2	$437.4
Drill, Mill, and Bore (Manual Tool Change):										
Vertical	D	D	D	D	D	D	D	D	D	D
Horizontal	D	D	D	D	D	D	D	D	D	D
Drill, Mill, and Bore (Automatic Tool Change):										
Vertical:										
Y–axis Travel Less Than 20 Inches	296	272	552	603	592	26.0	22.7	46.6	52.7	49.4
Y–axis Travel 20 Inches to 26 Inches	181	329	761	931	821	25.1	37.2	77.0	96.8	85.5
Y–axis Travel Over 26 Inches	67	95	212	278	298	15.2	18.5	37.6	47.9	56.0
Horizontal:										
Y–axis Travel Less Than 27 Inches	D	D	D	307	274	D	D	D	85.2	82.6
Y–axis Travel 27 Inches to 40 Inches	59	D	D	157	110 E	22.5	D	D	57.6	40.0 E
Y–axis Travel Over 40 Inches	94	84	73	103	114	66.3	57.9	53.1	76.1	94.3
Machining Centers with automatic multiple spindle head changing capability	D	D	D	D	D	D	D	D	D	D
All other machining centers	D	D	D	D	D	D	D	D	D	D

Source: U.S. Department of Commerce
Note: r – revised, p – preliminary, E – estimated by NMTBA, D – not disclosed

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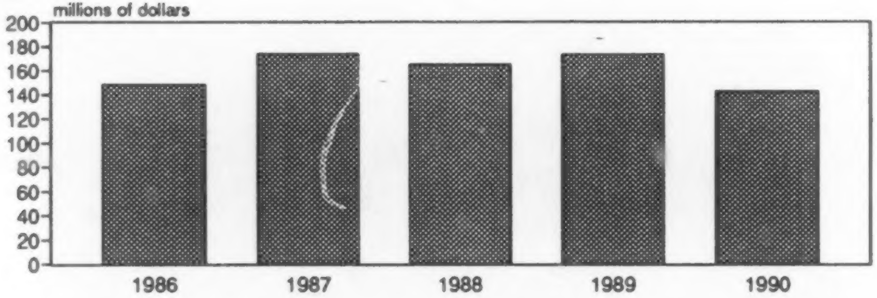

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(r)	1990(p)
Other Metal Cutting Machine Tools	13,496	13,785	17,741	18,936	15,492	$148.4	$173.9	$165.4	$173.7	$142.6
Other Metal Cutting valued under $2,500	7,882	8,020	10,828	11,359	8,521	8.8	8.5	11.8	11.4	8.3
Other Metal Cutting valued over $2,500	5,614	5,765	6,913	7,577	6,971	139.6	165.4	153.6	162.3	134.3
Broaching Machines	126	94	63	89	61	22.8	11.1	7.8	10.3	6.5
Sawing and Cutoff Machines:										
Power hack saws	137	104	84	61	D	1.2	1.3	1.0	1.0	D
Circular Cutoff Saws (Cold)	D	D	D	232	D	D	D	D	13.8	D
Abrasive Wheel Saws	D	D	D	D	D	D	D	D	D	D
Band Saws	2,719	2,904	3,862	4,542	4,314	27.6	26.1	35.3	43.0	41.8
All other sawing and cutoff machines	615	558	617	658	666	15.9	15.3	20.9	18.9	18.5
Tapping Machines	D	D	D	D	D	D	D	D	D	D
Spark Erosion, ultrasonic, and electrolytic machines:										
Electrical Discharge Machines Traveling Wire EDM Electrochemical Machines All other spark erosion, ultrasonic and electrolytic machines	938	660	626	652	595	33.2	24.8	26.3	30.4	25.9
Miscellaneous Metal Cutting Machine Tools	720	758	1,381	1,159	1,033	28.7	25.2	43.0	36.0	30.4

Source: U.S. Department of Commerce Note: r – revised, p – preliminary, D – not disclosed

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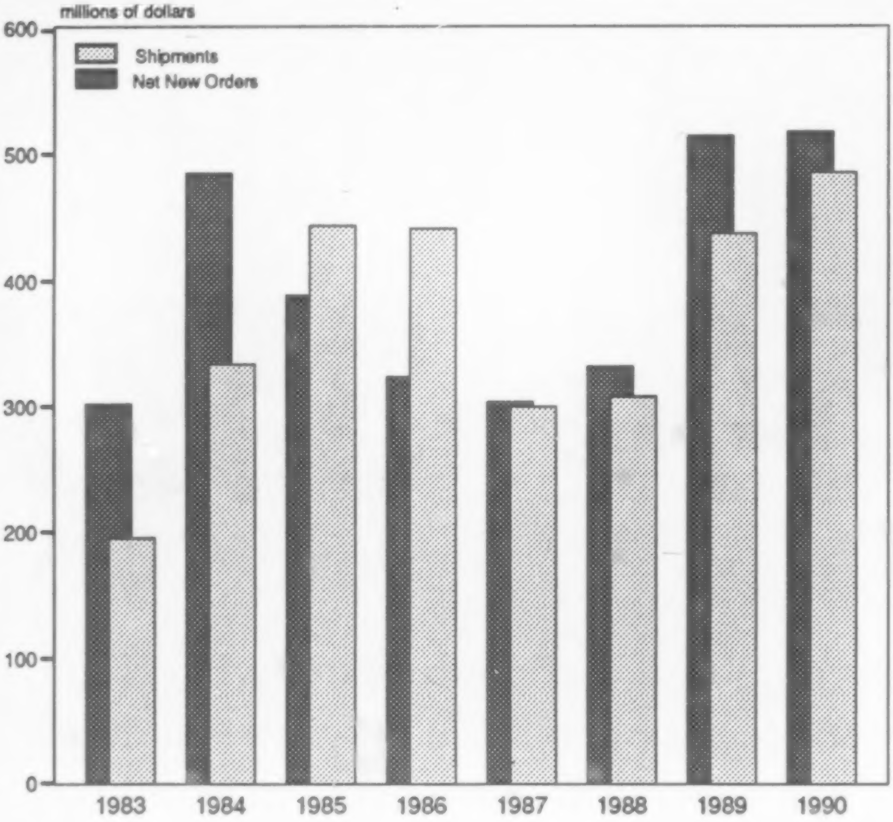

(in millions of dollars)

Year	Shipments	Net New Orders
1983	$194	$301
1984	333	484
1985	443	388
1986	441	323
1987	299	303
1988	307	331
1989	437	514
1990	485	517

Source: Robotics Industries Association

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(r)	1990(p)
Punching, Shearing, Bending and Forming	25,541	25,274	25,830	21,816	21,435	$292.1	$315.3	$372.3	$418.0	$414.0
Punching and Shearing										
Valued less than $2,500	4,794	3,287	4,292	3,701	3,363	4.7	4.3	5.0	4.7	4.2
Punches, including combination punching and shearing	1,551	1,684	1,985	1,864	2,445	13.8	16.8	21.6	28.3	36.8
Punching machines fixed position and two axis positioning table	444	394	507	520	477	50.0	61.7	75.9	83.3	75.0
Plate Shearing Machines:										
Mechanical	382	344	422	532	374	24.1	31.4	33.8	46.7	45.0
Hydraulic	554	771	877	981	1,080	11.3	13.9	13.9	17.8	19.7
Bar, angle, and rotary shearing machines	94	118	106	90	90	1.0	2.5	1.1	1.6	1.2
Other power operated punching and shearing machines	402	207	256	263	244	17.4	11.4	16.0	17.7	13.8
Bending and Forming valued less than $2,500	9,736	11,534	10,591	7,222	7,001	7.8	10.8	8.9	6.8	6.8
Press Brakes:										
Mechanical	78	74	122	D	D	7.6	3.3	3.8	D	D
Hydraulic	615	657	842	787	808	29.3	30.9	43.2	47.3	52.9
Hydromechanical	147	134	D	D	D	3.9	3.9	D	D	D
Bending rolls, sheet and plate	281	360	448	479	455	6.0	6.4	21.7	25.6	16.6
Bending rolls, angles, bars, shapes and tubes	D	D	D	139	193	D	D	D	10.7	16.9
Rotary bending and forming machines, including rotary head	1,893	2,229	2,239	2,062	2,039	27.3	26.1	27.4	26.9	27.9
Ram and press bending machines	D	D	D	415	375	D	D	D	9.6	8.9
Other bending and forming machines, incl. folders	3,191	2,984	2,523	2,595	2,296	63.6	67.6	70.1	84.5	81.9

Source: U.S. Department of Commerce
Note: r – revised, p – preliminary, D – not disclosed

See graph next page.

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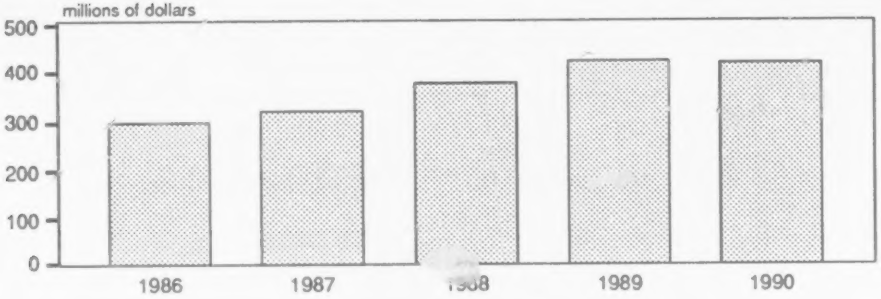
U.S. MACHINE TOOL SHIPMENTS

Punching, Shearing, Bending and Forming



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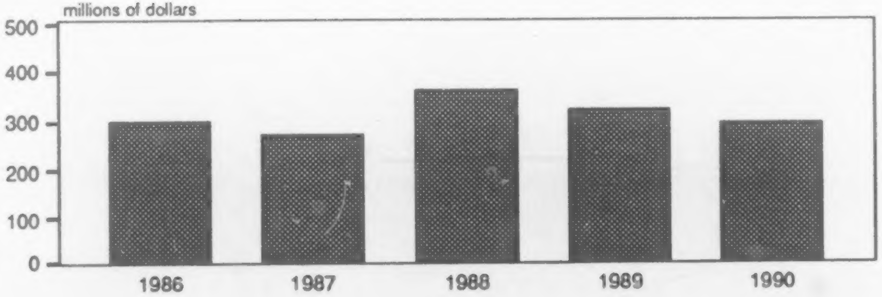
U.S. MACHINE TOOL SHIPMENTS

Presses



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(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(p)	1990(p)
Presses	9,439	8,134	9,593	8,959	7,144	$293.1	$265.6	$356.5	$316.5	$289.7
All presses valued under $2,500	6,754	5,585	6,572	5,520	4,425 E	5.0	4.0	5.3	3.4	9.8 E
Mechanical presses:										
Open back inclinable, gap type:										
50 tons and under	430	423	449	483	363	8.2	4.7	6.6	7.6	6.0
51 tons to 120 tons	205	151	194	214	183	13.2	7.3	11.6	12.5	10.1
121 tons and over	61	59	14	D	D	3.0	2.8	1.0	D	D
Vertical straight side and arch frame single action:										
Single point	D	D	D	D	D	D	D	D	D	D
Two point 300 tons and under	} 72	61	68	91	86	} 12.4	15.0	13.1	19.3	19.8
Two point 301 tons and over			41	58	47			18.5	36.3	27.0
Gap and horn type	37	36	D	D	D	3.7	4.0	D	D	D
Automatic presses, strip or coil field	241	331	409	438	364	47.0	52.0	56.9	72.2	64.8
All other mechanical presses	138	62	176	D	135 E	79.5	76.7	174.6	D	85.8 E
Vertical Single Action, all tonnages:										
Hydraulic Presses:										
Housing or Straight Side Type	55	14	30	18	D	11.1	4.3	7.4	4.5	D
Column and Open Rod Type	95	113	84	D	90 E	5.8	10.8	10.4	D	10.0 E
Gap or C–Frame:										
15 Tons and Under	438	472	571	469	471	3.4	3.7	5.5	3.8	4.1
16–35 Tons	48	D	65	55	64	2.0	D	2.4	2.3	2.7
Over 35 Tons	63	D	59	66	75 E	4.4	D	6.9	6.2	6.1
Vertical double action 2 –slide type – all tonnages	D	D	D	D	D	D	D	D	D	D
Extrusion Presses, all types	D	D	D	D	D	D	D	D	D	D
Other hydraulic & pneumatic presses, incl. horiz.	699	594	782	1,135	1,072	17.2	24.0	21.8	24.5	28.5

Source: U.S. Department of Commerce

See graph previous page.

Note: r – revised, p – preliminary, E – estimated by NMTBA, D – not disclosed

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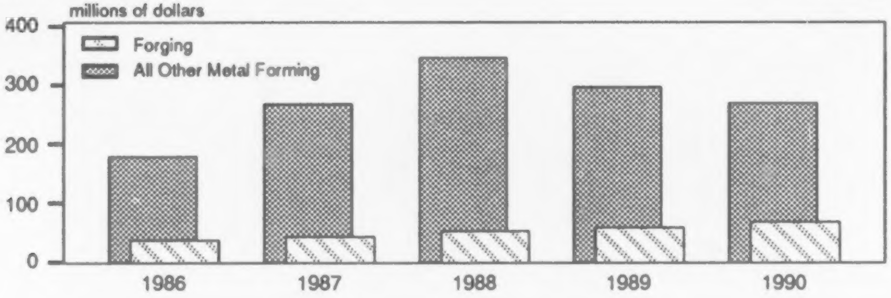
U.S. MACHINE TOOL SHIPMENTS

Forging and Other Metal Forming



(values in millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988(r)	1989(r)	1990(p)	1986	1987	1988(r)	1989(r)	1990(p)
Forging Machines	179	184	225 E	228 E	202 E	$36.7	$42.7	$52.5 E	$58.5 E	$67.5 E
Headers and upsetters	179	184	225 E	228 E	202 E	36.7	42.7	52.5 E	58.5 E	67.5 E
Swaging Machines										
Forging presses (die stamping presses)										
All other forging machines										
All other metal forming machine tools	10,761	14,817	19,608	16,359	15,232	176.3	264.2	342.1	292.7	265.3
All other metal forming machine tools valued at less than $2,500	5,724	10,424	13,254	10,371	9,540	5.5	5.6	7.6	8.4	7.6
Thread rolling machinery	308	297	400	322	247	20.4	9.7	9.7	16.2	11.3
Metal container-making machinery	765	1,300	1,569	1,825	517	51.1	140.0	168.4	141.7	93.0
Die casting machines:										
200 tons and under	139	180	185	136	104	35.3	49.5	58.0	43.8	53.5
201 tons to 500 tons										
501 tons to 700 tons										
701 tons and over										
Riveting machines	2,018	1,096	2,193	1,340	2,378	19.1	15.3	24.0	20.3	34.8
All other metal forming type machine tools, n.e.c.	1,807	1,520	2,007	2,365	2,436	44.8	44.1	74.4	62.3	65.0

Source: U.S. Department of Commerce

Note: n.e.c. – not elsewhere classified, r – revised, p – preliminary, E – estimated by NMTBA, D – not disclosed

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U.S. MACHINE TOOL SHIPMENTS

Metal Cutting Historical Series

(values in millions of U.S. dollars)

Year	TOTAL	Boring Machines	Drilling Machines	Gear Cutting and Finishing	Grinding and Polishing	Turning Machines	Milling Machines	Machining Centers	Station Type Machines	Other Metal Cutting Machines
1961	$ 531.3	$ 51.5	$ 36.8	$ 36.4	$121.0	$126.5	$ 73.7	D	D	$ 85.4
1962	626.8	61.4	53.2	35.8	127.9	152.3	95.8	D	D	100.4
1963	657.6	67.9	52.0	39.5	136.8	154.8	106.1	D	$ 43.6	56.9
1964	874.5	74.1	72.3	47.1	175.9	198.1	125.8	D	95.5	85.7
1965	1,047.8	91.9	83.2	55.7	213.6	234.8	144.0	D	132.7	92.0
1966	1,231.9	110.9	105.9	59.0	235.9	286.5	201.7	D	120.1	111.9
1967	1,373.2	117.8	122.8	63.9	247.8	334.0	234.3	D	131.7	120.9
1968	1,309.4	93.7	67.7	68.2	235.1	316.2	234.1	$ 91.1	104.6	98.7
1969	1,242.6	80.2	67.5	65.6	227.3	288.9	184.6	84.4	140.9	103.2
1970	1,097.7	62.1	70.9	66.3	219.4	240.1	110.0	68.8	167.4	92.8
1971	714.5	35.8	43.4	50.1	142.9	174.9	54.4	38.8 E	97.2	76.7
1972	858.0	54.1	65.8	50.3	151.0	203.2	81.7	D	132.6	119.3
1973	1,224.7	66.7	90.5	55.4	209.6	299.0	104.6	115.0	190.7	93.2
1974	1,525.6	81.4	77.9	66.2	249.9	370.2	137.7	163.1	258.5	120.7
1975	1,790.4	83.9	92.9	65.1	273.2	464.2	134.0	196.7	354.6	125.8
1976	1,592.2	77.8	100.4	56.0	246.8	430.3	134.4	178.4	223.0	145.2
1977	1,791.3	84.9	107.2	61.4	273.1	436.3	160.2	175.1	318.9	174.1
1978	2,334.4	117.7	152.4	102.7	348.6	535.9	194.3	246.0	322.5	314.4
1979	3,037.2	177.4	150.5	111.2	474.9	650.3	279.8	356.5	607.6	229.0
1980	3,716.4	192.0	166.9	130.3	555.8	827.0	339.3	413.0	813.5	278.6
1981	4,046.9	231.0	140.0	133.1	615.4	816.8	436.6	482.7	896.1	295.4
1982	2,940.6	193.8	65.9	86.5	486.7	507.3	265.6	357.6	731.1	246.2
1983	1,564.2	95.8	41.1	35.8	280.8	320.9	146.5	182.9	274.0	186.4
1984	1,688.3	96.1	37.2	40.0	335.6	307.6	179.9	213.2	311.9	166.8
1985	1,877.3	85.1	43.8	51.8	415.0	318.7	180.6	214.7	406.1	161.5
1986	1,911.6	83.9	40.0	57.3	419.7	262.0	169.2	213.4	517.7	148.4
1987	1,780.7	154.7		59.6	384.7	283.5	206.9	217.8	299.6	173.9
1988	1,734.8	133.9		48.9	359.8	282.5	184.5	334.5	225.4	165.4
1989	2,428.5	183.2		97.3	419.8	343.2	206.2	442.2	562.9	173.7
1990	2,351.8	179.4		99.6	418.9	359.4	214.3	437.4	500.2	142.6

Source: U.S. Department of Commerce Note: E – estimated by NMTBA, D – not disclosed

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U.S. MACHINE TOOL SHIPMENTS

(values in millions of U.S. dollars)

Year	TOTAL	Presses	Forging Machines	Punching and Shearing Machines	Bending and Forming Machines	Other Metal Forming Machines
1961	$ 233.1	$111.3	$15.8	$ 33.3	$ 32.5	$ 40.2
1962	240.4	109.5	23.7	34.5	29.0	43.7
1963	309.5	136.0	22.3	42.8	45.2	63.2
1964	334.6	169.5	23.1	33.2	42.7	66.1
1965	409.9	209.2	32.8	43.9	49.4	74.6
1966	480.9	253.3	32.7	49.7	51.0	94.2
1967	496.1	240.1	29.6	56.9	57.4	112.1
1968	413.4	199.1	31.9	57.1	64.4	60.9
1969	449.6	223.7	32.0	53.6	66.0	74.3
1970	454.1	239.6	36.6	47.7	59.8	70.4
1971	343.4	166.5	37.0	41.4	53.3	45.2
1972	411.3	166.7	34.5	62.5	67.9	79.8
1973	563.1	242.7	38.7	75.8	94.5	111.4
1974	640.4	307.0	40.1	86.1	113.0	94.2
1975	615.7	269.4	39.5	121.0	115.4	70.4
1976	586.0	223.6	52.2	120.0	118.8	71.4
1977	662.1	260.7	55.1	130.6	137.2	78.5
1978	808.2	350.9	59.3	146.6	147.7	103.7
1979	1,026.8	434.0	84.7	181.2	183.4	143.5
1980	1,096.0	440.8	73.8	204.2	214.9	162.3
1981	1,064.3	429.6	79.0	206.1	212.8	136.7
1982	863.6	344.8	79.0	142.2	166.5	131.1
1983	580.6	160.8	48.0	120.1	138.6	113.1
1984	738.1	230.1	29.0	139.2	177.9	161.9
1985	804.9	254.0	35.4	144.0	178.4	193.1
1986	798.2	293.1	36.7	122.3	169.9	176.2
1987	887.9	265.6	42.7	142.0	173.4	264.2
1988	1,123.4	356.5	52.5	167.3	204.9	342.1
1989	1,085.7	316.5	58.5	200.1	217.9	292.7
1990	1,036.5	289.7	67.5	195.7	218.3	265.3

Source: U.S. Department of Commerce

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for names of distributors in Switzerland, or where to get parts for a 20–year–old machine, or what projects are funded in Sumatra, or information on anything else in the world relating to the design, manufacture, and marketing of capital goods for manufacturing

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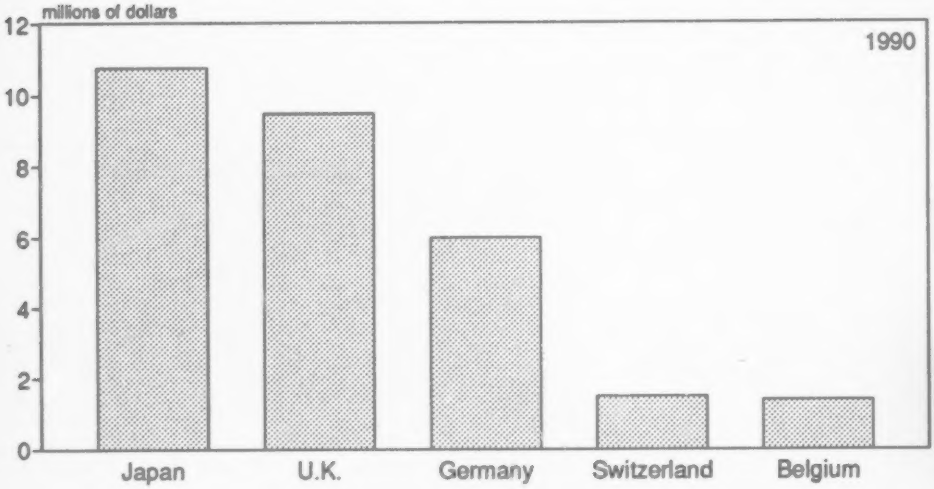
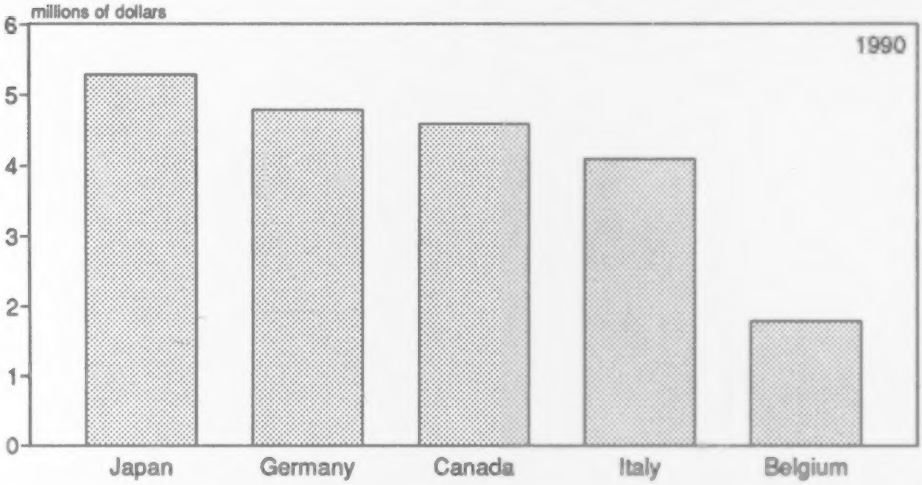


(in millions of dollars)

Country of Origin	1986	1987	1988	1989	1990
WORLD TOTAL	$26.8	$19.8	$21.0	$38.6	$33.8
EUROPE	na	na	na	22.4	20.7
Belgium	0.1	0.1	0.4	3.1	1.4
France	0.8	0.3	0.1	0.1	0.4
Germany	5.1	5.3	4.1	9.1	6.0
Italy	1.9	1.8.	0.8	0.6	0.4
Sweden	0.2	0.2	0.1	1.1	0.6
Switzerland	0.7	1.6	1.0	0.9	1.5
United Kingdom	5.0	2.6	2.9	7.0	9.5
Other	na	na	na	0.5	0.9
NORTH AND CENTRAL AMERICA	na	na	na	1.6	1.4
Canada	2.0	0.9	1.2	1.5	1.3
Other	na	na	na	0.1	0.1
ASIA	na	na	na	14.5	11.5
Japan	2.3	3.2	8.4	13.0	10.8
Taiwan	5.3	2.4	0.6	1.0	0.5
Other	na	na	na	0.5	0.3
OTHER	na	na	na	0.1	0.1

Source: U.S. Department of Commerce

p – preliminary, r – revised, na – not available,
E – estimated by NMTBA, D – not disclosed, n.e.c – not elsewhere classified



(in millions of dollars)

Country of Origin	1986	1987	1988	1989	1990
WORLD TOTAL	$7.9	$6.7	$5.7	$17.5	$25.3
EUROPE	na	na	na	10.7	14.8
Belgium	na	na	0.2	1.7	1.8
Germany	0.9	0.9	0.6	3.1	4.8
Italy	2.1	0.5	(a)	1.4	4.1
Switzerland	0.5	0.4	0.2	0.8	0.9
United Kingdom	0.7	0.5	0.4	2.1	1.6
Other	na	na	na	1.6	1.6
NORTH AND CENTRAL AMERICA	na	na	na	2.7	4.9
Canada	0.7	1.3	2.2	2.4	4.6
Other	na	na	na	0.3	0.3
ASIA	na	na	na	3.8	5.6
Japan	2.4	2.7	1.1	3.3	5.3
Other	na	na	na	0.5	0.3
OTHER	na	na	na	0.3	(a)

Source: U.S. Department of Commerce

Note: (a)— Less than $50,000

(values in thousands of dollars)

Machine Classification	1989 Units	1989 Value	1990 Units	1990 Value
Traveling wire electro–discharge machines				
NC	732	$60,803	} 847	$60,639
non–NC	257	16,700		
Electro–discharge machines, n.e.c.				
NC	159	11,229	337	20,834
non–NC	377	15,358	464	10,787
Vert. mach. ctrs., ATC, Y–axis travel				
not over 660mm(26")	2,456	201,060	2,027	165,264
over 660mm(26")	226	30,291	147	26,601
Horiz. mach. ctrs., ATC	832	136,510	623	141,574
Mach. ctrs., n.e.c.	296	42,644	224	66,463
Unit construction mach. (single station transfer)				
NC	31	4,393	24	2,798
non–NC	15	777	2	517
Multi–station transfer machines,				
NC	27	20,051	52	38,705
non–NC	108	28,948	87	38,893
Horiz. lathes, multiple spindle, NC	365	51,824	280	49,572
Horiz. lathes, power rating				
under 18.65 kW (25 HP), NC	3,030	227,428	2,061	147,846
18.65–37.3 kW (25–50 HP), NC	656	85,013	546	77,476
over 37.3 kW (50 HP), NC	88	13,648	54	14,755
Horiz. engine or toolroom lathes, non–NC	3,076	29,624	4,350	44,007
Automatic bar and/or chucking mach.,				
single spindle, non–NC	509	12,768	927	15,939
mult. spindle, non–NC	150	6,433	136	13,550
Horizontal lathes, n.e.c., non–NC	929	13,330	1,735	16,601
Vertical turret lathes,				
multiple spindle, NC	28	12,802	22	3,936
n.e.c., NC	47	7,499	58	11,750
Vertical lathes, excl. VTLs,				
mult. spindle, NC	4	1,164	—	—
n.e.c., NC	77	9,317	95	12,201
Vertical turret lathes, non–NC	65	4,818	102	4,481
Vertical lathes, n.e.c., excl. VTLs, non–NC	830	23,321	1,138	24,052
Way–type unit head machines	12	836	7	1,928
Other drilling machines, NC	522	38,961	324	22,710
Drilling machines,				
multiple spindle, non–NC	125	5,721	90	1,985
radial, non–NC	463	2,890	487	3,479
Drilling, upright, excl. sensitive, turret & deep hole, non–NC	199	1,553	83	898
Drilling machines, n.e.c., non–NC	472	24,979	458	14,628
Boring–milling machines				
horiz. spind., table, excl. planer, NC	16	3,932	11	2,551
horiz. spind., n.e.c., NC	216	15,980	91	14,114
n.e.c., NC	58	5,706	41	5,292
horiz. spindle, n.e.c., non–NC	42	1,612	30	2,276
excl. horiz. spindle, n.e.c., non–NC	163	6,654	100	6,014
Boring machines				
vertical, NC	17	6,395	3	1,471
vertical, non–NC	75	946	70	2,059
n.e.c., NC	12	2,790	28	3,553
n.e.c., non–NC	228	13,079	288	7,217

(continued)

p – preliminary, r – revised, na – not available,
E – estimated by NMTBA, D – not disclosed, n.e.c – not elsewhere classified

U.S. MACHINE TOOL IMPORTS

Metal Cutting by Machine Classification

(continued)

(values in thousands of dollars)

Machine Classification	1989 Units	1989 Value	1990 Units	1990 Value
Milling machines,				
knee type, NC	1,090	$16,338	514	$ 9,369
knee type, non–NC	3,737	31,813	3,330	23,887
excl. knee type, n.e.c., NC	504	43,058	504	24,037
profile, dup., or die sinking, non–NC	107	859	35	394
bed type, non–NC	96	2,889	56	3,746
n.e.c., non–NC	648	17,511	873	20,600
Threading or tapping machines				
n.e.c., NC	296	15,073	175	9,537
n.e.c., non–NC	289	9,190	187	5,474
Flat surface grinding machines				
NC	159	11,750	138	14,546
recip.–table type, non–NC	1,123	12,369	1,052	12,074
n.e.c., non–NC	1,813	19,639	1,972	21,246
Grinding mach.,				
of an accuracy at least 0.01mm, n.e.c., NC	547	91,743	537	97,253
external cylindrical, (incl. univ.), non–NC	457	14,689	495	19,954
internal cylindrical, non–NC	146	12,984	245	12,373
accuracy at least 0.01mm, n.e.c., non–NC	1,178	45,541	1,124	44,645
Sharpening machines (tool & cutter grinding)				
NC	342	4,027	245	6,346
non–NC	729	9,890	796	9,580
Honing or lapping machines				
NC	35	6,889	34	4,576
non–NC	195	6,760	231	9,134
Grinding, honing, polishing & lapping mach.				
n.e.c., NC	52	4,498	56	3,748
n.e.c., non–NC	1,329	32,821	1,524	44,642
Planing machines				
NC	—	—	—	—
non–NC	6	109	8	53
Shaping or slotting machines				
NC	36	5,571	85	3,347
non–NC	55	3,450	182	7,534
Broaching machines				
NC	13	6,366	13	11,534
non–NC	44	4,344	79	7,313
Gear cutting for bevel gears	na	na	—	—
Gear hobbers	103	15,952	119	10,899
Gear shapers	19	3,034	38	13,645
Gear cutting machines, n.e.c.	443	1,546	173	591
Gear grinding or finishing for bevel gears	na	na	75	2,585
Gear grinding or finishing machines	183	24,944	121	29,076
Sawing or cut–off machines				
NC	171	4,211	102	6,214
non–NC	1,809	25,975	1,949	32,183
Metal cutting machine tools, n.e.c.	706	17,415	367	18,951
Used or rebuilt machine tools	6,482	38,579	7,713	33,795
Machine tools valued at less than $2,500	715,675	97,494	942,917	92,336
METAL CUTTING TOTAL	758,607	1,859,106	986,513	1,766,635
NC Cutting Total	13,189	1,203,314	10,325	1,086,646

Source: U.S. Department of Commerce

p – preliminary, r – revised, na – not available,
E – estimated by NMTBA, D – not disclosed, n.e.c – not elsewhere classified

Metal Forming and Totals by Machine Classification

(values in thousands of dollars)

Machine Classification	1989 Units	1989 Value	1990 Units	1990 Value
Die casting machines	4,105	$44,684	376	$28,298
Headers and upsetters, including cold headers	138	11,618	161	15,377
Forging or die stamping machines, and hammers, n.e.c.	1,416	81,502	827	49,098
Bending, folding, straight. or flat. mach., incl. presses, NC	991	37,184	530	38,505
Press brakes, non–NC	374	9,764	313	9,221
Bending rolls, non–NC	77	2,022	93	2,974
Bending, folding, straight., or flat., n.e.c., non–NC	1,071	45,446	1,233	43,272
Shearing machines, NC	57	6,661	55	5,214
Shearing machines, non–NC	738	14,001	588	16,530
Punching or notching mach.,				
incl. comb. punch & shear, NC	362	40,916	318	38,986
incl. comb. punch & shear, non–NC	643	13,688	682	15,755
Hydraulic presses, NC	43	6,466	22	20,256
Hydraulic presses, non–NC	684	23,578	2,458	20,449
Presses, n.e.c., NC	93	6,498	51	4,820
Mechanical transfer presses, non–NC	66	23,337	16	35,884
Mechanical presses, n.e.c., non–NC	na	na	185	5,481
Presses, n.e.c., non–NC	1,085	82,903	795	37,117
Draw benches for bars, tubes, profiles, wire or the like	39	5,009	159	9,810
Thread rolling machines	62	3,086	91	5,690
Machines for working wire	742	35,780	1,397	71,322
Metal forming machine tools, n.e.c.	799	29,113	778	33,316
Used or rebuilt machine tools	3,037	17,486	1,545	25,307
Machine tools valued at less than $2,500	22,580	6,799	20,268	5,766
METAL FORMING TOTAL	39,202	547,543	32,941	538,448
NC Forming Total	1,546	97,727	976	107,781
GRAND TOTAL: Cutting and Forming	**797,809**	**2,406,649**	**1,019,454**	**2,305,083**
NC Total	14,735	1,301,041	11,301	1,194,427

Source: U.S. Department of Commerce

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p – preliminary, r – revised, na – not available,
E – estimated by NMTBA, D – not disclosed, n.e.c – not elsewhere classified

LEADING SOURCES OF U.S. MACHINE TOOL IMPORTS

(values in millions of dollars)

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
WORLD TOTAL	$1,482.9	$1,253.3	$946.5	$1,356.6	$1,738.5	$2,251.8	$1,995.4	$2,058.7	$2,406.6	$2,305.1
Japan	687.5	529.2	414.9	683.3	854.1	1,173.6	1,061.2	1,112.5	1,337.2	1,068.5
Germany	192.3	204.6	125.7	205.7	248.9	367.9	332.0	277.5	338.7	394.1
Taiwan	102.4	90.9	83.4	99.2	134.2	119.3	127.5	135.5	141.5	135.1
United Kingdom	136.1	107.5	66.4	74.7	93.5	100.7	85.4	105.8	97.5	123.2
Switzerland	78.4	71.8	54.7	78.4	95.2	115.3	103.6	94.9	104.5	121.3
Italy	42.9	45.0	49.3	51.3	76.6	129.8	72.4	76.6	79.9	94.6
Canada	44.0	36.6	29.4	40.8	61.2	52.9	49.2	56.6	71.5	89.9
Sweden	28.3	23.4	15.3	19.2	29.0	22.6	23.6	25.8	24.5	49.7
Spain	24.3	20.6	11.6	16.2	19.8	23.1	[illegible]	22.1	22.6	29.9
France	26.5	12.9	10.5	13.9	19.2	36.9	17.6	17.0	23.8	27.6
Belgium	18.5	9.1	7.1	6.7	10.3	12.7	9.4	18.8	28.2	22.5
Singapore	14.1	11.6	4.4	7.1	15.9	7.3	9.3	12.1	18.8	19.2
South Korea	14.6	18.7	9.8	8.8	9.0	10.9	14.7	14.9	28.3	18.9
Brazil	9.9	9.3	6.8	5.0	21.5	19.2	7.3	29.6	11.9	12.9
All Others	63.1	62.1	57.2	46.3	50.1	59.6	65.7	59.0	78.0	97.8

Source: U.S. Department of Commerce

LEADING SOURCES OF U.S. MACHINE TOOL IMPORTS

(values in millions of dollars)

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
WORLD TOTAL	$1,291.5	$1,057.4	$716.9	$1,056.7	$1,374.7	$1,654.6	$1,435.9	$1,543.3	$1,859.1	$1,766.6
Japan	627.4	467.8	340.0	550.6	721.4	841.8	721.3	839.2	1,042.6	852.6
Germany	148.4	155.0	91.6	137.1	186.7	279.6	268.0	228.1	271.2	313.0
Taiwan	101.6	89.9	82.4	97.3	130.4	116.1	123.0	128.8	132.1	126.2
United Kingdom	120.5	94.1	56.6	60.8	67.1	77.4	68.7	88.7	80.7	105.0
Switzerland	65.4	61.1	40.5	66.1	76.3	96.6	81.1	76.4	87.0	95.4
Italy	31.6	36.5	21.4	38.5	45.3	92.3	45.6	43.0	52.1	55.0
Spain	21.9	19.0	9.5	13.6	17.9	19.4	14.2	18.1	19.5	25.5
France	20.6	9.3	6.6	8.5	12.7	27.3	13.8	12.4	22.0	24.0
Canada	28.2	22.4	12.7	17.2	30.4	23.3	19.1	19.3	20.8	21.5
Singapore	14.0	11.6	4.2	6.7	15.6	6.9	7.5	10.6	17.9	18.7
South Korea	14.5	18.3	9.8	8.8	8.9	10.8	14.3	14.4	27.7	18.1
Sweden	19.9	14.9	7.7	11.9	15.3	11.0	16.3	10.3	13.6	16.7
Brazil	9.8	9.0	6.5	4.3	7.7	4.2	2.3	6.3	7.4	12.7
Belgium	10.8	5.6	3.0	0.5	3.4	3.0	1.5	3.0	5.5	1.7
All Others	56.9	42.9	24.4	34.8	35.6	44.9	39.2	44.7	59.0	80.5

Source: U.S. Department of Commerce

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LEADING SOURCES OF U.S. MACHINE TOOL IMPORTS

(values in millions of dollars)

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
WORLD TOTAL	$191.4	$196.0	$229.5	$299.9	$363.8	$597.2	$559.5	$515.4	$547.5	$538.4
Japan	60.1	61.5	74.9	132.7	132.7	331.8	339.9	273.2	294.5	215.9
Germany	44.0	49.6	34.1	68.6	62.2	88.3	63.9	49.3	67.5	81.0
Canada	15.8	14.2	16.7	23.5	30.8	29.6	30.1	37.4	50.6	68.4
Italy	11.3	8.6	27.9	12.8	31.3	37.5	26.8	33.5	27.8	39.5
Sweden	8.3	8.5	7.6	7.3	13.7	11.6	7.3	15.5	10.9	32.9
Switzerland	13.0	10.7	14.2	12.3	18.9	18.7	22.6	18.5	17.5	25.9
Belgium	7.7	3.5	4.1	6.2	6.9	9.8	7.9	15.8	22.7	20.8
United Kingdom	15.6	13.5	9.8	13.9	26.5	23.3	16.7	17.1	16.8	18.2
Taiwan	0.8	1.0	1.0	1.9	3.9	3.1	4.5	6.7	9.4	8.9
Spain	2.4	1.6	2.1	2.6	1.9	3.7	2.3	4.0	3.1	4.4
France	5.9	3.6	3.9	5.4	6.5	9.6	3.8	4.6	1.8	3.7
South Korea	0.1	0.3	(a)	(a)	0.1	0.1	0.4	0.5	0.6	0.7
Singapore	(a)	(a)	0.1	0.4	0.3	0.4	1.8	1.6	0.9	0.5
Brazil	0.1	0.4	0.3	0.6	13.9	15.0	4.9	23.3	4.5	0.2
All Others	6.3	19.0	32.8	11.7	14.2	14.7	26.6	14.4	19.1	17.4

Source: U.S. Department of Commerce

Note: (a) — less than $50,000

U.S. MACHINE TOOL IMPORTS

Other Manufacturing Technology by Machine Classification

(values in thousands of dollars)

	1989		1990	
Machine Classification	Units	Value	Units	Value
Machine tool parts and accessories	~	$579,435	~	$564,515
Parts for working rubber or plastics	na	na	~	328,098
Quenching or cutting oils	~	79	~	339
Industrial robots for lifting, handling, loading or unload	1,961	43,625	2,113	37,810
Parts for industrial robots for lifting, handling, etc.	na	na	~	100,220
Laser, light or photon beam				
for working metal, NC	121	18,124	167	30,702
for working metal, non–NC	48	4,954	78	4,408
for other materials	2,125	6,935	563	9,066
Ultrasonic processes				
for working metal, NC	6	952	—	—
for working metal, non–NC	12	29	13	158
for working other materials	148	1,163	329	256
Injection molding mach.,				
for manufacturing shoes	na	na	147	3,389
for rubber or oth. thermosetting	1,029	90,553	839	69,739
for thermoplastics	2,685	268,022	2,482	223,604
Extruders for:				
rubber or other thermosetting materials	216	24,197	217	16,326
processing thermoplastics	731	43,996	973	62,728
Blow molding machines	302	43,082	339	52,191
Vacuum–molding and other thermoforming machines	315	15,800	292	9,921
Machines for molding or				
retreading pneumatic tires	na	na	653	57,022
otherwise forming inner tubes	na	na	271	14,450
otherwise forming n.e.c.	na	na	1,034	50,598
Machines for working rubber or plastics n.e.c.	na	na	15,508	121,293
Industrial robots, n.e.c.	23,945	137,767	14,363	83,416
Industrial robot parts	~	47,214	~	36,999
Numerical controls for controlling machine tools	13,534	52,862	15,054	45,547
Machines and appliances for testing metals	~	14,217	~	13,077
Machines for balancing mechanical parts	~	10,405	~	13,536
Profile projectors	~	4,925	~	6,660
Industrial process control instr., hydraulic	~	2,846	~	2,424
Industrial process control instr., pneumatic	~	3,419	~	4,803

Source: U.S. Department of Commerce

Note: ~ – unit measure is not meaningful

U.S. MACHINE TOOL IMPORTS

by Type and Country of Origin
1990

(values in millions of dollars)

	Units	Value		Units	Value
Boring Machines	**662**	**$44,547**	**Drilling Machines**	**1,442**	**$43,701**
Germany	138	13,379	Japan	385	22,087
Japan	35	7,675	France	26	4,991
Italy	176	6,493	Germany	80	4,107
United Kingdom	17	4,681	Italy	29	2,629
Switzerland	10	2,951	Spain	255	2,236
Others	286	9,367	Others	667	7,650
Gear Cutting	**526**	**$56,795**	**Grinding Machines**	**8,449**	**$300,119**
Germany	239	38,220	Japan	1,449	115,319
Switzerland	103	8,939	Germany	1,564	79,788
Japan	85	5,388	Switzerland	382	24,669
Netherlands	5	1,096	United Kingdom	670	19,666
United Kingdom	38	1,022	Taiwan	2,341	15,399
Others	56	2,131	Others	2,043	45,278
NC Horiz. Lathes	**2,941**	**$289,649**	**NC Vert. Lathes**	**175**	**$27,887**
Japan	2,386	238,264	Japan	89	17,463
Germany	66	17,767	France	17	2,374
Taiwan	142	7,839	Italy	8	2,124
Austria	126	6,429	Switzerland	20	1,532
United Kingdom	93	6,155	Austria	16	1,208
Others	128	13,196	Others	25	3,185
Non–NC Lathes	**8,388**	**$118,630**	**Milling Machines**	**5,312**	**$82,032**
Germany	403	16,668	Japan	166	17,426
Japan	157	15,693	Taiwan	1,922	13,480
Switzerland	97	14,555	Spain	1,571	12,709
Taiwan	1,594	12,492	Germany	295	11,140
United Kingdom	662	11,625	Italy	66	8,264
Others	5,475	47,596	Others	1,292	19,012

(continued)

Note: represents machines valued over $2,500 only

p – preliminary, r – revised, na – not available,
E – estimated by NMTBA, D – not disclosed, n.e.c – not elsewhere classified

U.S. MACHINE TOOL IMPORTS

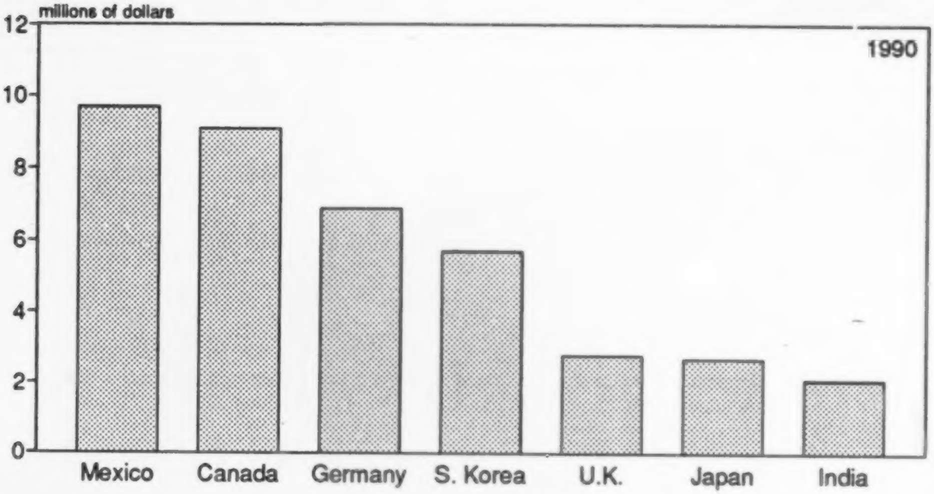
by Type and Country of Origin
1990
(continued)

(values in millions of dollars)

	Units	Value		Units	Value
Machining Centers	**3,021**	**$399,902**	**Station Type**	**172**	**$82,841**
Japan	1,767	255,942	Japan	43	40,044
Germany	209	71,296	Germany	41	23,167
United Kingdom	438	27,447	Italy	20	5,556
Taiwan	158	13,575	Canada	11	4,788
Singapore	151	8,354	Switzerland	24	4,381
Others	298	23,287	Others	33	4,905
Other Cutting	**4,795**	**$194,401**	**Punching & Shearing**	**1,643**	**$76,484**
Japan	1,436	97,818	Japan	330	29,959
Germany	565	27,383	Germany	354	16,955
Switzerland	461	26,712	Switzerland	40	5,096
United Kingdom	228	16,075	Canada	114	4,123
Canada	339	4,531	Belgium	138	4,103
Others	1,766	21,883	Others	667	16,249
Bending & Forming	**2,169**	**$93,972**	**Presses**	**3,527**	**$124,008**
Japan	441	23,721	Japan	409	58,777
Canada	603	21,287	Canada	353	18,304
Germany	246	14,603	Sweden	69	16,468
Sweden	128	11,156	Germany	148	13,298
United Kingdom	62	4,991	United Kingdom	152	4,815
Others	689	18,214	Others	2,396	12,345
Forging Machines	**988**	**$64,475**	**Other Forming**	**2,801**	**$148,435**
Japan	322	37,071	Japan	1,099	60,228
Germany	118	8,216	Germany	410	22,841
Canada	162	4,381	Italy	265	21,653
Italy	48	4,167	Canada	270	15,574
Switzerland	19	3,507	Switzerland	200	11,015
Others	319	7,134	Others	557	17,124

Source: U.S. Department of Commerce

Note: represents machines valued over $2,500 only



(in millions of dollars)

Country of Destination	1986	1987	1988	1989	1990
TOTAL	$36.1	$44.6	$60.6	$53.9	$58.2
EUROPE	10.5	12.1	13.1	10.7	16.2
Belgium	0.3	0.2	0.8	0.4	0.3
France	1.2	2.1	1.0	0.9	1.0
Germany	1.1	1.3	0.7	1.8	6.9
Italy	1.6	0.6	2.4	3.1	1.1
Switzerland	0.4	0.4	0.3	0.1	0.5
Turkey	1.6	2.2	0.4	(a)	0.4
United Kingdom	0.8	1.8	4.7	2.9	2.8
Other	2.3	3.3	2.8	1.5	3.1
NORTH AND CENTRAL AMERICA	14.8	17.3	22.8	19.6	19.7
Canada	3.9	5.1	5.6	6.5	9.1
Mexico	10.4	11.8	16.8	12.6	9.7
Other	0.5	0.4	0.4	0.5	0.9
SOUTH AMERICA	2.9	4.8	8.2	5.0	2.8
Brazil	0.6	0.9	0.8	1.5	1.3
Colombia	0.2	0.7	1.3	1.1	0.2
Venezuela	2.0	2.7	5.2	1.4	0.7
Other	0.1	0.5	0.9	1.0	0.6
ASIA	7.7	9.5	15.3	16.4	16.3
China	0.2	1.7	3.4	5.4	1.0
India	1.9	(a)	0.5	1.0	2.1
Japan	2.5	1.0	1.5	1.9	2.7
South Korea	0.4	3.0	6.4	3.4	5.7
Singapore	1.4	1.9	0.9	1.6	1.5
Taiwan	0.6	0.5	0.4	0.8	0.7
Thailand	na	na	na	0.7	0.2
Other	0.7	1.4	2.1	1.6	2.5
OCEANIA	0.2	0.6	0.9	1.9	2.5
AFRICA	0.1	0.3	0.4	0.2	0.7

Source: U.S. Department of Commerce
Note: (a) — Less than $50,000

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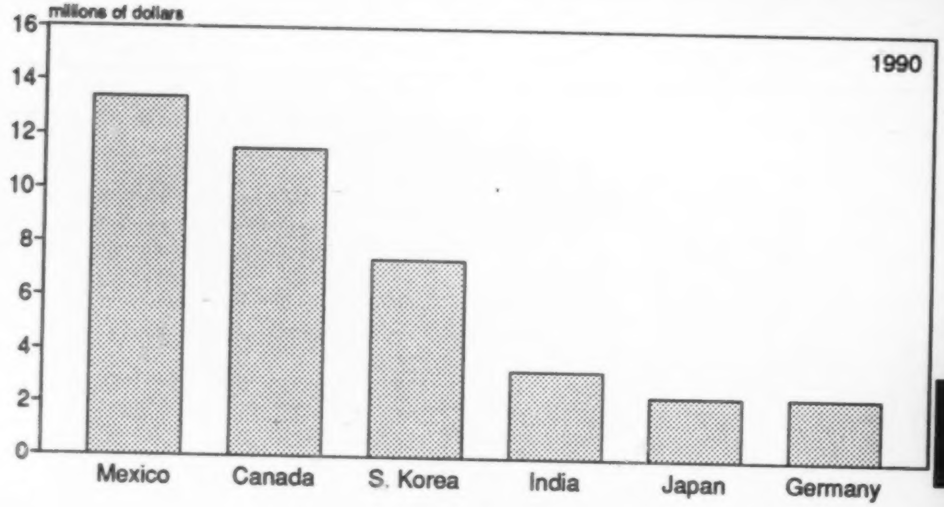

(in millions of dollars)

Country of Destination	1986	1987	1988	1989	1990
TOTAL	$7.6	$19.1	$16.7	$63.7	$61.5
EUROPE	1.6	0.9	4.0	9.0	9.3
Germany	0.1	0.4	0.6	1.4	2.4
Italy	0.8	0.1	0.2	0.6	0.6
Netherlands	0.1	—	—	2.9	0.4
United Kingdom	0.1	0.3	1.1	1.2	1.7
Other	0.5	0.1	2.1	2.9	4.1
NORTH AND CENTRAL AMERICA	2.6	3.8	7.5	16.3	26.7
Canada	0.5	0.6	2.2	5.0	11.5
Mexico	2.0	3.1	5.2	10.1	13.4
Other	0.1	0.1	0.1	1.2	1.9
SOUTH AMERICA	0.2	4.4	1.7	8.6	2.7
Brazil	(a)	1.3	0.2	1.7	0.5
Colombia	0.1	0.1	0.5	0.9	0.7
Venezuela	(a)	2.9	0.1	3.7	0.7
Other	0.1	0.1	0.9	2.3	0.8
ASIA	3.0	9.7	3.3	20.0	21.9
China	(a)	3.3	1.2	3.3	1.5
Hong Kong	(a)	0.1	—	1.1	0.4
India	—	0.1	(a)	0.4	3.3
Japan	0.5	0.1	0.2	2.0	2.4
South Korea	0.1	5.3	1.5	10.2	7.4
Singapore	0.5	0.4	0.1	0.6	1.8
Taiwan	1.7	—	—	0.4	1.0
Thailand	na	na	na	1.5	0.5
Other	0.2	0.4	0.3	0.5	3.7
OCEANIA	0.2	0.2	0.1	1.0	0.6
AFRICA	0.1	0.1	0.1	8.8	0.2

Source: U.S. Department of Commerce
Note: (a) — Less than $50,000

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p – preliminary, r – revised, na – not available,
E – estimated by NMTBA, D – not disclosed, n.e.c – not elsewhere classified

(values in thousands of dollars)

Machine Classification	1989 Units	1989 Value	1990 Units	1990 Value
Electro–discharge machines	344	$5,082	92	$7,923
Vert. mach. ctrs., ATC, Y–axis travel				
not over 660mm(26")	31	4,918	81	14,083
over 660mm(26")	9	1,343	19	4,543
Horiz. mach. ctrs., ATC	45	19,679	54	14,676
Mach. ctrs., n.e.c.	295	19,796	234	23,314
Unit construction mach. (single station transfer)				
NC	3	2,683	2	230
non–NC	8	4,445	9	4,870
Multi–station transfer machines				
NC	10	17,348	21	33,589
non–NC	18	3,918	24	5,959
Horiz. lathes, multiple spindle, NC	4	634	25	5,881
Horiz. lathes, power rating				
under 18.65 kW (25 HP), NC	184	15,356	294	23,157
18.65–37.3 kW (25–50 HP), NC	50	9,433	68	9,273
power rating over 37.3 kW (50 HP), NC	8	1,767	22	5,587
Horiz. engine or toolroom lathes, non–NC	96	2,221	117	2,020
Automatic bar and/or chucking machines				
single spindle, non–NC	20	109	20	532
mult. spindle, non–NC	42	2,945	57	2,883
Horiz. lathes, n.e.c., non–NC	266	3,588	454	5,641
Vertical turret lathes				
multiple spindle, NC	—	—	4	1,255
n.e.c., NC	5	863	6	1,443
Vertical lathes, excl. VTLs				
mult. spindle, NC	2	539	15	1,347
n.e.c., NC	13	1,448	47	9,105
Vertical turret lathes,				
non–NC	23	698	61	1,247
n.e.c., excl. VTLs, non–NC	71	3,537	81	4,557
Way–type unit head machines	17	3,318	26	6,427
Other drilling machines, NC	107	7,765	101	9,039
Drilling machines				
multiple spindle, non–NC	22	1,240	33	1,704
radial, non–NC	25	963	21	209
Drilling, upright, excl. sensitive, turret & deep hole, non–NC	68	953	103	2,192
Drilling machines, n.e.c., non–NC	531	6,009	716	4,854
Boring–milling machines				
horiz. spind., table, excl. planer, NC	7	2,588	4	1,664
horiz. spindle, n.e.c., NC	4	738	8	2,856
n.e.c., NC	33	2,492	20	1,155
horiz. spindle, n.e.c., non–NC	3	247	2	250
excl. horiz. spindle, n.e.c., non–NC	103	2,100	28	1,139
Boring machines				
vertical, NC	4	1,294	8	2,483
vertical, non–NC	41	1,167	44	1,451
n.e.c., NC	1	1,350	9	3,308
n.e.c., non–NC	55	3,618	31	1,502

(continued)

Metal Cutting by Machine Classification

(continued)

(values in thousands of dollars)

Machine Classification	1989 Units	1989 Value	1990 Units	1990 Value
Milling machines				
knee type, NC	25	$1,699	22	$ 2,273
knee type, non–NC	54	2,342	124	4,402
excl. knee type, n.e.c., NC	60	8,177	59	20,911
profile, dup., or die sinking, non–NC	24	1,290	26	555
bed type, non–NC	55	7,023	2	288
n.e.c., non–NC	303	6,716	210	6,567
Threading or tapping machines				
n.e.c., NC	34	2,030	41	1,577
n.e.c., non–NC	286	6,635	726	6,580
Flat surface grinding machines				
NC	153	11,682	86	9,339
recip.–table type, non–NC	137	1,823	59	1,040
n.e.c., non–NC	98	8,715	39	7,902
Grinding mach.,				
accuracy of at least 0.01mm, n.e.c., NC	321	27,305	112	32,263
external cylindrical, (incl. univ.), non–NC	45	5,835	53	6,269
internal cylindrical, non–NC	59	5,919	53	3,594
accuracy of at least 0.01mm, n.e.c., non–NC	474	21,481	384	15,639
Sharpening machines (tool & cutter grinding)				
NC	57	5,741	49	4,252
non–NC	1,204	11,593	1,084	14,729
Honing or lapping machines				
NC	2	58	4	827
non–NC	741	9,784	893	14,609
Grinding, honing, polishing & lapping machines				
n.e.c., NC	35	3,653	20	1,402
n.e.c., non–NC	630	14,786	1,190	18,731
Planing machines				
NC	6	3,712	6	788
non–NC	176	6,065	279	7,445
Shaping or slotting machines				
NC	—	—	9	365
non–NC	56	1,356	38	1,168
Broaching machines				
NC	4	369	13	1,600
non–NC	53	2,364	28	2,066
Gear hobbers	78	6,909	42	5,758
Gear shapers	67	5,561	51	7,000
Gear cutting machines, n.e.c.	87	32,273	96	40,356
Gear grinding or finishing machines	62	9,141	67	5,766
Sawing or cut–off machines				
NC	37	1,907	123	4,492
non–NC	1,073	14,108	1,466	19,230
Metal cutting machine tools, n.e.c.	371	13,697	1,256	25,202
Used or rebuilt machine tools	6,033	53,927	5,007	58,208
Machine tools valued at less than $2,500	40,171	14,963	39,124	23,482
METAL CUTTING TOTAL	55,639	488,833	55,802	600,022
NC Cutting Total	1,633	184,588	1,812	259,312

Source: U.S. Department of Commerce

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LEADING U.S. MACHINE TOOL EXPORT MARKETS

All Machine Tools

(values in millions of dollars)

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
WORLD TOTAL	$1,027.6	$615.0	$406.0	$409.3	$452.4	$590.3	$650.4	$768.3	$949.8	$1,062.5
Canada	256.1	82.3	61.7	82.6	82.0	85.0	98.5	108.7	110.8	183.0
Mexico	258.9	135.9	42.5	45.7	63.8	93.9	89.0	126.8	107.3	109.3
Germany	35.2	21.8	30.9	21.4	23.1	37.0	32.0	40.4	61.5	91.3
Japan	54.2	51.0	35.7	39.4	36.2	52.1	55.4	64.1	78.1	83.7
United Kingdom	64.1	59.8	35.0	40.8	31.2	43.3	24.9	57.7	99.9	83.4
South Korea	15.0	11.2	8.8	8.3	14.9	31.4	85.9	73.2	98.6	81.8
China	1.5	2.4	16.6	13.0	26.6	50.5	42.5	37.4	40.8	37.3
France	29.2	19.2	12.5	11.6	6.7	10.6	12.2	16.8	22.4	28.3
Taiwan	16.2	8.1	9.2	5.2	6.6	11.7	12.0	25.6	32.2	28.2
Italy	16.7	14.9	15.5	6.8	11.2	16.8	16.0	21.3	24.6	28.2
Brazil	24.2	21.0	10.9	18.5	24.6	16.5	24.9	21.0	21.2	27.8
India	15.2	15.4	5.4	6.4	6.6	9.9	5.7	10.7	20.5	27.6
Australia	21.6	11.1	8.0	7.3	14.6	8.1	11.4	14.3	18.2	23.1
Belgium	4.9	2.9	1.5	4.3	2.3	23.5	12.6	7.6	12.4	22.9
Netherlands	7.4	3.3	2.7	2.0	2.9	3.5	4.6	7.4	11.5	15.9
Singapore	13.7	14.7	9.3	5.1	12.4	8.1	10.0	9.3	16.1	15.3
Spain	14.2	6.3	2.1	2.7	3.7	3.2	2.8	7.2	7.4	11.8
Venezuela	15.1	14.3	2.9	5.3	7.0	6.5	13.6	25.2	14.0	9.8
Switzerland	9.2	7.1	5.3	5.3	3.6	6.4	5.7	4.7	5.6	8.8
USSR	16.5	1.3	7.5	0.6	1.2	1.3	3.2	1.3	21.9	8.6
Thailand	2.2	0.8	1.9	1.8	1.6	0.3	1.8	5.7	6.5	8.6
Indonesia	2.2	0.7	0.9	0.7	3.2	1.5	1.7	0.9	4.4	7.4
Malaysia	1.9	0.7	0.9	1.3	3.2	0.7	1.9	3.6	2.6	7.1
Austria	1.3	1.2	2.3	0.2	0.7	1.1	17.2	1.3	2.1	3.0
All Others	130.9	107.6	76.0	73.0	62.5	67.4	64.9	76.1	109.2	110.3

Source: U.S. Department of Commerce

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LEADING U.S. MACHINE TOOL EXPORT MARKETS

(values in millions of dollars)

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
WORLD TOTAL	$724.0	$403.5	$258.3	$250.2	$285.9	$371.3	$383.5	$443.7	$488.8	$600.0
Canada	208.0	57.6	33.8	45.4	49.3	43.6	60.5	61.5	68.4	115.6
Germany	27.3	16.5	17.0	12.7	12.1	20.9	19.5	17.8	31.3	61.2
Mexico	190.8	78.0	24.6	31.4	40.3	63.8	54.9	89.0	60.2	54.6
South Korea	12.7	9.0	6.0	6.7	9.8	19.2	44.3	48.2	36.0	47.2
United Kingdom	46.7	49.3	29.5	30.6	19.9	35.8	15.0	32.4	60.2	46.2
Japan	40.8	36.6	30.1	23.8	20.1	35.8	29.3	30.0	30.7	45.5
India	10.4	11.7	4.2	2.8	4.4	7.7	4.5	8.3	11.6	20.9
China	1.3	2.0	13.1	10.1	21.7	34.8	22.1	27.1	29.1	20.5
Belgium	1.6	2.1	0.8	3.3	1.4	20.9	11.5	6.1	7.6	20.1
Italy	10.1	6.5	8.7	6.0	8.9	6.7	10.5	13.1	14.8	19.0
Brazil	14.7	16.2	8.0	17.4	20.9	14.3	15.6	10.7	11.8	17.6
Australia	15.3	6.1	3.2	2.0	4.0	3.9	5.9	3.6	11.2	15.7
Taiwan	6.5	7.3	7.8	4.2	3.8	4.1	7.5	13.0	9.6	11.3
France	19.1	13.9	5.1	4.1	3.6	4.6	5.8	7.6	11.8	8.9
Singapore	10.4	11.6	6.3	2.3	7.4	5.1	5.2	6.8	7.9	8.7
USSR	15.1	1.2	7.4	0.6	0.4	1.0	2.1	1.2	20.9	7.9
Venezuela	7.9	7.0	1.6	1.8	5.5	3.6	5.7	15.2	5.5	7.2
Netherlands	1.5	1.3	1.2	0.7	1.7	2.4	1.8	2.9	4.6	6.2
Spain	8.2	4.0	1.4	1.1	3.0	2.0	1.1	2.1	3.2	6.0
Switzerland	7.8	5.4	5.2	2.0	2.6	4.9	3.9	2.9	4.0	5.7
Malaysia	0.9	0.2	0.4	0.2	2.1	0.2	0.4	0.5	1.0	2.5
Thailand	1.2	0.6	1.8	1.7	0.4	0.2	0.3	1.2	2.6	2.3
Austria	1.2	1.0	1.9	0.1	0.6	0.4	16.9	0.8	1.3	0.5
Indonesia	0.7	0.6	0.3	0.1	3.1	1.5	1.0	0.4	4.2	0.4
All Others	63.8	57.8	38.9	39.1	38.9	33.9	38.2	41.3	39.3	48.3

Source: U.S. Department of Commerce

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LEADING U.S. MACHINE TOOL EXPORT MARKETS

(values in millions of dollars)

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
WORLD TOTAL	$303.6	$211.5	$147.7	$159.1	$166.5	$219.1	$266.9	$324.6	$461.0	$462.5
Canada	48.2	24.7	28.0	37.2	32.7	41.4	38.0	47.2	42.4	67.4
Mexico	68.1	57.9	17.9	14.4	23.5	30.1	34.1	37.9	47.0	54.7
Japan	13.4	14.4	5.6	15.6	16.1	16.4	26.1	34.2	47.5	38.2
United Kingdom	17.3	10.5	5.6	10.2	11.3	7.5	10.0	25.4	39.7	37.1
South Korea	2.3	2.3	2.8	1.6	5.1	12.2	41.5	25.0	62.6	34.7
Germany	7.9	5.3	13.9	8.8	10.9	16.1	12.5	22.6	30.2	30.2
France	10.0	5.3	7.4	7.5	3.1	6.1	6.4	9.2	10.6	19.4
Taiwan	9.7	0.8	1.4	0.9	2.8	7.6	4.5	12.6	22.6	17.0
China	0.2	0.4	3.6	2.8	4.9	15.7	20.4	10.3	11.7	16.7
Brazil	9.5	4.8	3.0	1.1	3.8	2.3	9.3	10.3	9.4	10.2
Netherlands	5.9	2.0	1.5	1.4	1.2	1.1	2.8	4.6	6.9	9.8
Italy	6.7	8.5	6.8	0.8	2.3	10.1	5.4	8.1	9.9	9.2
Australia	6.2	5.0	4.7	5.3	10.6	4.3	5.5	10.7	7.1	7.4
Indonesia	1.5	1.0	0.6	0.6	(a)	(a)	0.7	0.5	0.2	6.9
India	4.8	3.7	1.1	3.6	2.2	2.2	1.2	2.3	8.9	6.7
Singapore	3.3	3.1	2.9	2.8	5.0	3.0	4.8	2.5	8.2	6.6
Thailand	1.1	0.1	0.1	0.1	1.2	0.1	1.4	4.5	3.9	6.3
Spain	6.0	2.3	0.6	1.4	0.7	1.2	1.7	5.2	4.3	5.8
Malaysia	0.9	0.5	0.4	1.1	1.1	0.5	1.5	3.1	1.6	4.6
Switzerland	1.4	1.7	0.2	3.3	1.0	1.5	1.8	1.7	1.5	3.1
Belgium	3.2	0.8	0.7	1.0	0.9	2.6	1.1	1.5	4.8	2.8
Venezuela	7.2	7.3	1.3	3.5	1.5	2.9	8.0	10.0	8.4	2.5
Austria	0.1	0.2	0.4	0.1	(a)	0.7	0.3	0.5	0.8	2.5
USSR	1.4	0.1	(a)	0.1	0.7	0.2	1.0	0.1	1.0	0.7
All Others	67.3	48.8	37.2	33.9	23.9	33.3	26.9	34.6	69.8	61.9

Source: U.S. Department of Commerce

Note: (a) — Less than $50,000

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Metal Forming and Totals by Machine Classification

(values in thousands of dollars)

Machine Classification	1989 Units	1989 Value	1990 Units	1990 Value
Die casting machines	535	$ 8,753	365	$ 8,996
Headers and upsetters, including cold headers	21	20,859	61	23,979
Forging or die stamping machines, and hammers, n.e.c.	681	20,262	299	27,231
Bending, folding, straightening or flattening mach., incl. presses, NC	312	21,357	390	36,209
Press brakes, non–NC	33	1,308	158	3,793
Bending rolls, non–NC	56	1,686	102	3,209
Bending, folding, straight., or flattening, n.e.c., non–NC	618	22,357	1,209	30,498
Shearing machines, NC	59	4,249	92	7,790
Shearing machines, non–NC	274	5,471	424	9,685
Punching or notching mach., incl. comb. punch & shear,				
NC	162	23,923	172	26,135
non–NC	772	23,777	881	21,760
Hydraulic presses, NC	87	6,697	84	4,935
Hydraulic presses, non–NC	595	25,652	581	27,848
Presses, n.e.c., NC	64	7,435	147	12,730
Presses, mechanical, non–NC	223	13,211	108	12,548
Presses, n.e.c., non–NC	675	39,407	1,112	41,104
Draw benches for bars, tubes, profiles, wire or the like	273	6,784	242	6,670
Thread rolling machines	42	2,873	60	2,726
Machines for working wire	929	31,943	750	23,651
Metal forming machine tools, n.e.c.	2,035	104,370	1,636	58,520
Used or rebuilt machine tools	3,259	63,746	3,242	61,461
Machine tools valued at less than $2,500	6,403	4,837	14,164	10,991
METAL FORMING TOTAL	18,208	460,956	26,279	462,469
NC Forming Total	684	63,660	885	87,799
GRAND TOTAL: Cutting and Forming	**73,847**	**949,789**	**82,081**	**1,062,491**
NC Total	2,317	248,248	2,697	347,111

Source: U.S. Department of Commerce

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Other Manufacturing Technology by Machine Classification

(values in thousands of dollars)

Machine Classification	1989 Units	1989 Value	1990 Units	1990 Value
Machine tool parts and accessories	~	$714,343	~	$722,127
Parts for working rubber or plastic	na	na	~	282,599
Quenching or cutting oils	~	12,692	~	18,520
Industrial robots for lifting, handling, loading or unload	838	12,570	360	6,637
Parts for industrial robots for lifting, handling, etc.	na	na	~	74,510
Laser, light or photon beam for working any material	2,303	43,081	933	46,118
Ultrasonic process for working any material	92	798	77	1,915
Injection molding mach., for rubber or other thermosetting	239	21,666	305	21,848
Injection molding mach., for thermoplastics	400	47,037	423	54,100
Extruders for rubber or other thermosetting materials	260	11,772	352	16,584
Extruders for processing thermoplastics	940	35,563	845	41,527
Blow molding machines	509	28,366	557	43,754
Vacuum–molding and other thermoforming machines	1,554	15,110	4,713	13,781
Machines for molding or retreading pneumatic tires	na	na	1,522	20,511
otherwise forming inner tubes	na	na	449	29,446
otherwise forming, n.e.c.	na	na	1,467	23,546
Machines for working rubber or plastics, n.e.c.	na	na	5,684	109,676
Industrial robots, n.e.c.	2,417	34,221	6,146	58,292
Industrial robot parts	~	15,601	~	27,524
Numerical controls for controlling machine tools	9,154	40,757	1,937	28,709
Machines and appliances for testing metals	~	74,219	~	75,730
Machines for balancing mechanical parts	~	21,293	~	28,815
Profile projectors	~	7,997	~	6,956
Industrial process control instr., hydraulic or pneumatic	~	46,924	~	59,130

Source: U.S. Department of Commerce

Note: ~ – unit measure is not meaningful

U.S. MACHINE TOOL EXPORTS

by Type and Country of Destination
1990

(values in millions of dollars)

	Units	Value		Units	Value
Boring Machines	**154**	**$15,808**	**Drilling Machines**	**974**	**$17,998**
Canada	44	6,029	Canada	402	6,500
Brazil	8	1,850	Mexico	217	2,815
South Korea	7	1,751	United Kingdom	25	1,355
Italy	5	1,375	Germany	19	1,209
Israel	1	1,274	South Korea	40	630
Others	89	3,529	Others	271	5,489
Gear Cutting	**256**	**$58,881**	**Grinding Machines**	**4,026**	**$130,596**
South Korea	66	14,788	Canada	751	29,796
Japan	34	10,536	Japan	467	14,397
Canada	28	4,762	Mexico	342	9,896
Germany	24	4,747	Germany	404	9,477
USSR	14	4,615	China	101	7,848
Others	90	19,433	Others	1,961	59,182
NC Horiz. Lathes	**409**	**$43,897**	**NC Vertical Lathes**	**72**	**$13,150**
Canada	74	13,349	India	20	6,687
United Kingdom	126	9,069	Mexico	31	2,633
Belgium	83	7,301	Canada	5	1,905
Japan	35	2,299	Italy	2	830
Australia	8	2,230	Brazil	8	470
Others	83	9,649	Others	6	624
Non–NC Lathes	**790**	**$16,880**	**Milling Machines**	**443**	**$34,996**
Mexico	218	3,894	South Korea	13	5,403
Canada	136	3,619	Canada	80	3,977
United Kingdom	140	2,623	Taiwan	5	3,925
Venezuela	7	1,576	Mexico	141	3,848
Japan	39	796	Australia	26	3,478
Others	250	4,372	Others	178	14,365

(continued)

Note: represents machines valued over $2,500 only

p – preliminary, r – revised, na – not available,
E – estimated by NMTBA, D – not disclosed, n.e.c – not elsewhere classified

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U.S. MACHINE TOOL EXPORTS

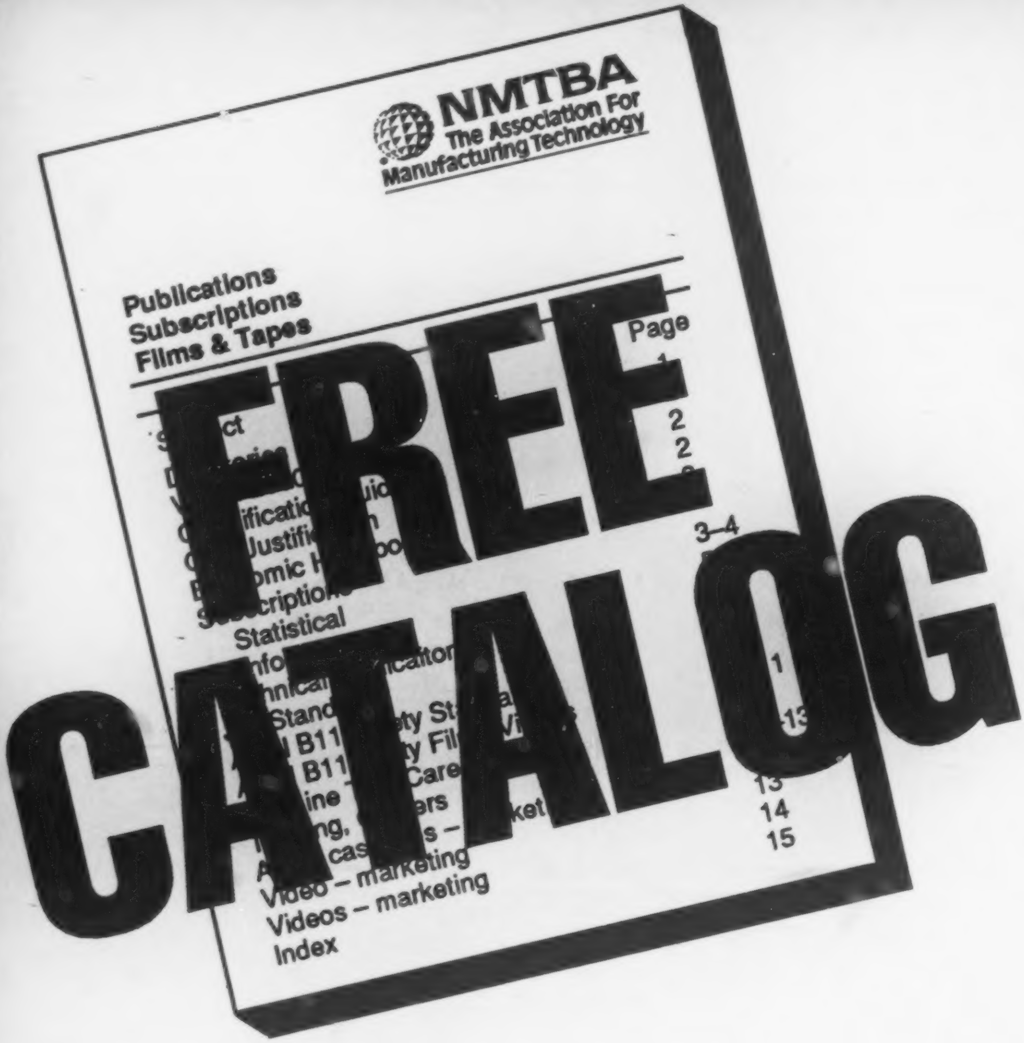
by Type and Country of Destination
1990
(continued)

(values in millions of dollars)

	Units	Value		Units	Value
Machining Centers	**388**	**$56,616**	**Station Type**	**82**	**$51,075**
Canada	99	17,144	Germany	21	27,992
Belgium	62	9,792	United Kingdom	6	9,863
China	34	6,297	Mexico	26	4,263
South Korea	37	5,161	Turkey	4	3,480
Mexico	55	4,191	Canada	2	1,860
Others	101	14,031	Others	23	3,617
Other Cutting	**4,077**	**$78,434**	**Punching & Shearing**	**1,569**	**$65,371**
Canada	778	14,037	Canada	393	12,570
Japan	276	9,860	United Kingdom	110	7,176
United Kingdom	302	6,787	Mexico	210	6,701
Mexico	428	6,321	Netherlands	60	5,790
Germany	182	4,799	France	52	4,269
Others	2,111	36,630	Others	744	28,865
Bending & Forming	**1,859**	**$73,708**	**Presses**	**2,032**	**$99,165**
Canada	553	18,336	Mexico	784	14,010
Mexico	225	8,919	South Korea	89	12,988
Indonesia	206	4,976	Canada	200	8,278
Philippines	65	4,789	Germany	75	7,812
South Korea	90	3,618	United Kingdom	116	7,649
Others	720	33,070	Others	768	48,428
Forging Machines	**282**	**$51,210**	**Other Forming**	**3,053**	**$100,563**
Japan	53	16,576	United Kingdom	396	11,214
United Kingdom	78	6,926	Canada	318	10,626
Germany	31	4,537	Germany	299	9,438
Canada	35	4,173	Mexico	390	7,360
South Korea	41	3,094	Japan	135	5,694
Others	44	15,904	Others	1,515	56,231

Source: U.S. Department of Commerce

Note: represents machines valued over $2,500 only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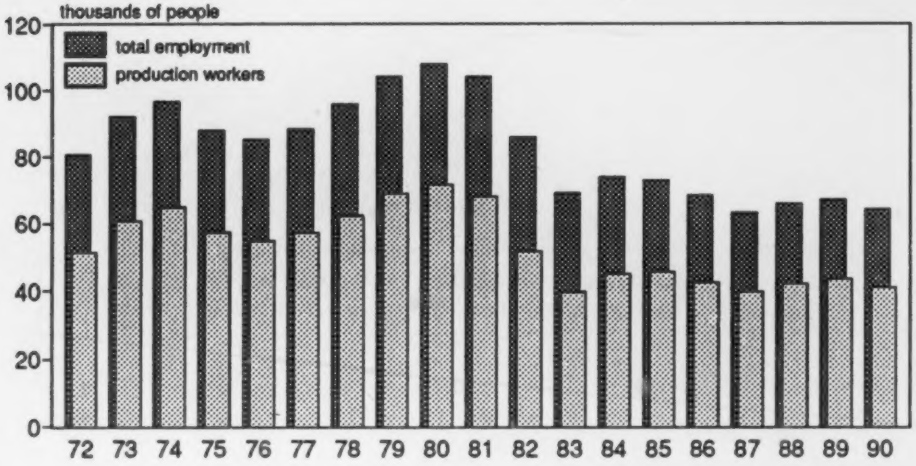


(in thousands of people)

Year	Metal Cutting Total Employment	Metal Cutting Production Workers	Metal Forming Total Employment	Metal Forming Production Workers	Cutting & Forming Total Employment	Cutting & Forming Production Workers
1971	56.6	39.4	na	na	na	na
1972	58.4	36.6	22.3	14.8	80.7	51.4
1973	66.6	43.4	25.5	17.5	92.1	60.9
1974	68.9	45.8	27.9	19.1	96.8	64.9
1975	63.7	41.7	24.3	15.7	88.0	57.4
1976	62.4	39.9	23.0	15.0	85.4	54.9
1977	65.2	41.9	23.3	15.4	88.5	57.3
1978	70.9	45.9	25.0	16.5	95.9	62.4
1979	77.4	51.2	26.9	17.7	104.3	68.9
1980	81.6	54.7	26.4	17.0	108.0	71.1
1981	80.0	52.0	24.4	15.3	104.4	68.1
1982	64.9	39.3	21.0	12.6	85.9	51.9
1983	52.0	29.9	17.1	9.9	69.1	39.8
1984	55.3	33.7	18.6	11.4	73.9	45.1
1985	53.8	33.9	19.2	11.8	73.0	45.7
1986	49.8	31.3	18.8	11.4	68.6	42.7
1987	46.2	29.1	17.2	10.8	63.4	39.9
1988	48.0	30.5	18.1	11.7	66.1	42.2
1989(r)	48.9	31.7	18.4	11.9	67.3	43.6
1990(p)	46.3	29.8	18.0	11.3	64.3	41.1

Source: U.S. Bureau of Labor Statistics

AVERAGE WEEKLY EARNINGS FOR PRODUCTION WORKERS

U.S. Metal Cutting

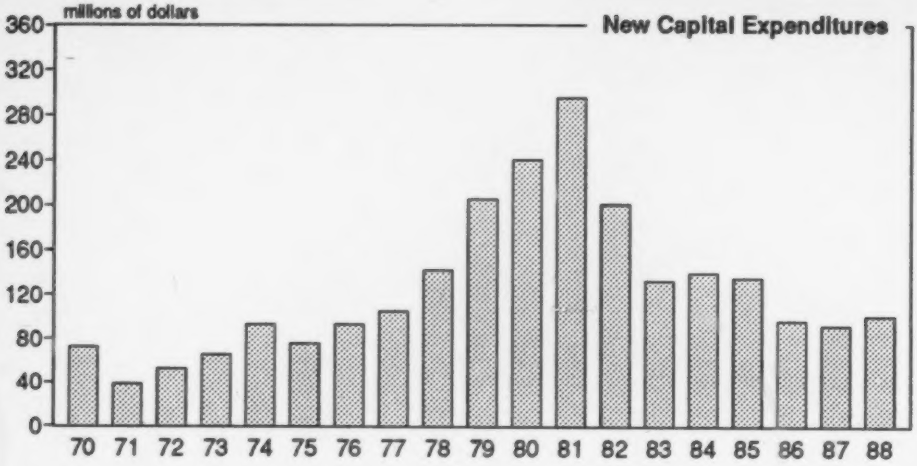
Year	Weekly Hours	Hourly Earnings	Weekly Earnings
1971	39.4	$4.20	$165.48
1972	42.8	4.62	197.74
1973	45.1	4.90	220.99
1974	46.4	5.12	237.57
1975	42.7	5.54	236.56
1976	41.8	6.03	252.05
1977	43.9	6.61	290.18
1978	44.8	7.20	322.56
1979	44.3	7.71	344.21
1980	43.7	8.38	366.21
1981	42.1	9.12	383.95
1982	38.9	9.78	380.44
1983	39.0	9.91	386.49
1984	42.4	10.20	432.48
1985	42.6	10.58	450.71
1986	42.4	10.96	464.70
1987	42.0	11.08	465.36
1988	43.0	11.32	486.76
1989	43.9	11.67	512.31
1990	41.6	12.20	507.52

AVERAGE WEEKLY EARNINGS FOR PRODUCTION WORKERS

U.S. Metal Forming

Year	Weekly Hours	Hourly Earnings	Weekly Earnings
1971	na	na	na
1972	42.4	$4.55	$192.92
1973	44.5	4.93	219.39
1974	43.3	5.28	228.62
1975	41.8	5.51	230.32
1976	42.1	6.04	254.28
1977	42.1	6.56	276.18
1978	43.0	7.34	315.62
1979	42.3	7.82	330.79
1980	41.2	8.48	349.38
1981	39.3	9.27	364.31
1982	38.0	9.97	378.86
1983	38.6	10.45	403.37
1984	42.4	10.61	449.86
1985	41.9	10.93	457.97
1986	42.0	11.49	482.58
1987	42.5	11.52	489.60
1988	44.8	11.86	531.33
1989	44.2	12.15	537.03
1990	43.1	12.41	534.87

Source: U.S. Bureau of Labor Statistics



(millions of dollars)

Year	Establishments Total	 With 20 or More Employees	Value Added Manufacture	Cost of Materials	Value of Shipments	New Capital Expenditures	End of Year Inventories
1970	na	na	$1,581.7	$ 992.6	$2,597.8	$ 72.7	$ 820.5
1971	na	na	1,183.7	751.2	2,018.8	39.1	726.0
1972	1,277	437	1,319.4	821.6	2,114.4	52.7	724.9
1973	na	na	1,760.6	1,134.9	2,777.3	65.9	885.7
1974	na	na	2,250.7	1,523.3	3,579.8	93.3	1,150.0
1975	na	na	2,258.6	1,533.5	3,834.4	76.1	1,100.4
1976	na	na	2,285.2	1,286.2	3,566.9	93.5	1,048.3
1977	1,343	469	2,588.0	1,491.7	3,943.3	105.1	1,237.5
1978	na	na	3,108.3	1,994.1	4,977.8	142.4	1,434.0
1979	na	na	3,837.8	2,423.9	6,052.5	205.7	1,689.2
1980	na	na	4,391.3	2,744.6	6,980.7	241.0	1,874.6
1981	na	na	4,716.4	2,850.0	7,481.0	296.2	1,965.2
1982	1,394	455	3,294.0	2,172.9	5,840.2	201.1	1,947.0
1983	na	na	2,242.3	1,554.9	4,023.2	132.9	1,713.2
1984	na	na	2,595.9	1,904.9	4,520.3	139.8	1,620.5
1985	na	na	2,933.2	2,070.3	4,789.8	135.3	1,919.0
1986	na	na	2,589.5	2,251.2	4,964.0	96.6	1,739.8
1987(r)	624	352	2,403.0	2,037.3	4,585.8	92.3	1,586.1
1988(p)	na	na	2,749.3	2,228.6	4,890.5	101.0	1,643.7

Sources: U.S. Bureau of the Census, "Census of Manufactures, 1972, 1977, 1982, 1987 Metalworking Machinery and Equipment" and "Annual Survey of Manufactures"

Note: The machine tool industry (Standard Industrial Classification SIC 3541 and 3542) produces primarily metal cutting and metal forming machine tools. It also produces other (secondary) products, such as small cutting tools, attachments and accessories and others. These secondary products as well as machine tool parts and some other items are included in this table. It therefore differs from other Census and NMTBA data on shipments of machine tools.

p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed

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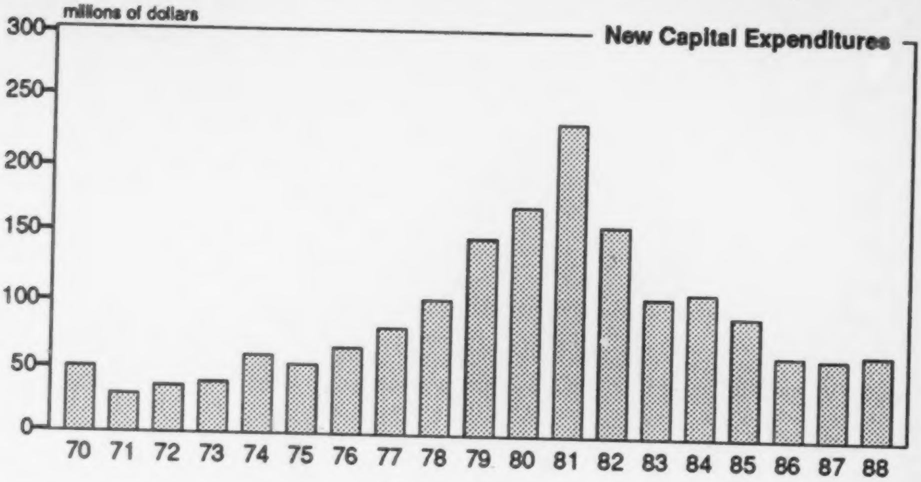
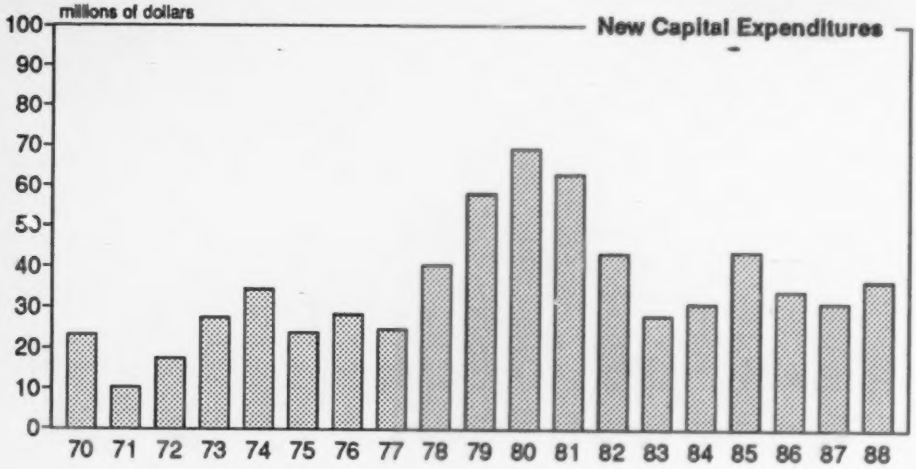


(millions of dollars)

Year	Establishments Total	Establishments With 20 or More Employees	Value Added Manufacture	Cost of Materials	Value of Shipments	New Capital Expenditures	End of Year Inventories
1970	na	na	$1,112.1	$ 664.0	$1,821.7	$ 49.3	$ 562.9
1971	na	na	819.8	473.2	1,351.1	28.7	492.8
1972	894	275	901.7	536.3	1,418.1	35.2	482.2
1973	na	na	1,214.1	764.1	1,891.1	38.4	591.9
1974	na	na	1,617.0	1,017.9	2,480.5	58.9	786.2
1975	na	na	1,640.3	1,050.3	2,727.8	52.2	737.9
1976	na	na	1,664.1	852.3	2,496.2	65.2	735.4
1977	917	306	1,866.1	1,047.7	2,812.7	80.4	877.9
1978	na	na	2,267.0	1,417.7	3,611.8	102.0	1,012.3
1979	na	na	2,833.8	1,736.9	4,389.0	147.6	1,242.2
1980	na	na	3,349.2	2,026.1	5,227.6	171.6	1,419.4
1981	na	na	3,739.9	2,187.3	5,865.3	233.2	1,485.5
1982	942	293	2,516.2	1,598.3	4,411.5	157.7	1,435.5
1983	na	na	1,612.7	1100.0	2,880.9	104.8	1,281.6
1984	na	na	1,820.0	1,369.5	3,211.6	108.8	1,196.5
1985	na	na	2,000.0	1,471.6	3,377.0	91.6	1,349.7
1986	na	na	1,823.8	1,538.0	3,456.1	62.7	1,215.6
1987(r)	417	232	1,668.7	1,399.5	3,189.5	61.2	1,056.8
1988(p)	na	na	1,828.1	1,404.2	3,137.8	64.5	1,093.3

Sources: U.S. Bureau of the Census, "Census of Manufactures, 1972, 1977, 1982, 1987 Metalworking Machinery and Equipment" and "Annual Survey of Manufactures"

Note: The metal cutting machine tool industry (Standard Industrial Classification SIC 3541) produces primarily metal cutting machine tools. It also produces other (secondary) products, such as plastics machinery, small cutting tools, attachments and accessories and others. These secondary products as well as machine tool parts and some other items are included in this table. It therefore differs from other Census and NMTBA data on shipments of machine tools.



(millions of dollars)

Year	Establishments Total	Establishments With 20 or More Employees	Value Added Manufacture	Cost of Materials	Value of Shipments	New Capital Expenditures	End of Year Inventories
1970	na	na	$ 469.6	$328.6	$ 776.1	$23.4	$257.6
1971	na	na	363.9	278.0	667.7	10.4	233.2
1972	383	162	417.7	285.3	696.3	17.5	242.7
1973	na	na	546.5	370.8	886.2	27.5	293.8
1974	na	na	633.7	505.4	1,099.3	34.4	363.8
1975	na	na	618.3	483.2	1,106.6	23.9	362.5
1976	na	na	621.1	433.9	1,070.7	28.3	312.9
1977	426	163	721.9	444.0	1,130.6	24.7	359.6
1978	na	na	841.3	576.4	1,366.0	40.4	421.7
1979	na	na	1,004.0	687.0	1,663.5	58.1	447.0
1980	na	na	1,042.1	718.5	1,753.1	69.4	455.2
1981	na	na	976.5	662.7	1,615.7	63.0	479.7
1982	452	162	777.8	574.6	1,428.7	43.4	511.5
1983	na	na	629.6	454.9	1,142.3	28.1	431.6
1984	na	na	775.9	535.4	1,308.7	31.0	242.0
1985	na	na	933.2	598.7	1,412.8	43.7	569.3
1986	na	na	765.7	713.2	1,507.9	33.9	524.2
1987(r)	207	120	734.3	637.8	1,396.3	31.2	529.3
1988(p)	na	na	921.2	824.4	1,752.7	36.5	550.4

Sources: U.S. Bureau of the Census, "Census of Manufactures, 1972, 1977, 1982, 1987 Metalworking Machinery and Equipment" and "Annual Survey of Manufactures"

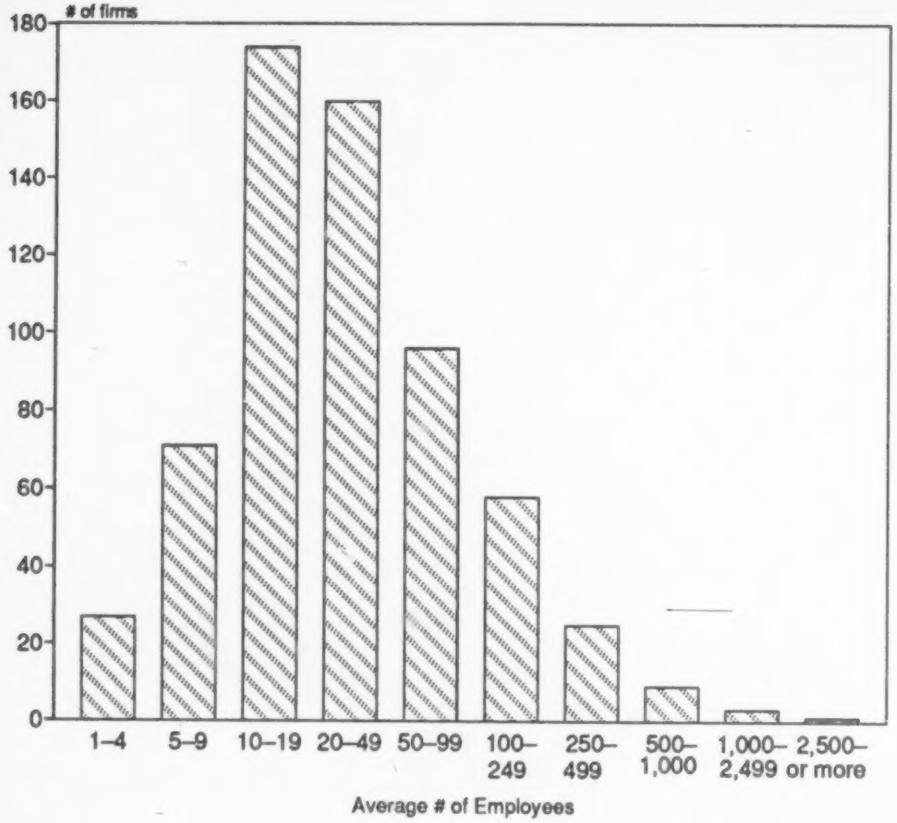
Note: The metal forming machine tool industry (Standard Industrial Classification SIC 3542) produces primarily metal forming machine tools. It also produces other (secondary) products, such as small cutting tools, attachments and accessories and others. These secondary products as well as machine tool parts and some other items are included in this table. It therefore differs from other Census and NMTBA data on shipments of machine tools.

Employment by State, 1989

State	Metal Cutting	Metal Forming	Total
U.S. Total	48,900	18,400	67,300
Alabama	D	146	D
Alaska	D	0	D
Arizona	432	D	D
Arkansas	D	D	D
California	2,930	1,043	3,973
Colorado	106	D	D
Connecticut	2,172	279	2,451
Delaware	D	0	D
Florida	477	200	677
Georgia	53	436	489
Hawaii	0	0	0
Idaho	D	0	D
Illinois	5,555	3,216	8,771
Indiana	481	354	835
Iowa	391	253	644
Kansas	33	166	199
Kentucky	839	D	D
Louisiana	D	D	D
Maine	D	D	D
Maryland	17	432	449
Massachusetts	2,730	526	3,256
Michigan	6,773	1,493	8,266
Minnesota	701	133	834
Mississippi	D	0	D
Missouri	1,341	131	1,472
Montana	0	0	0
Nebraska	155	D	D
Nevada	D	D	D
New Hampshire	769	D	D
New Jersey	508	377	885
New Mexico	0	0	0
New York	3,964	1,895	5,859
North Carolina	321	325	646
North Dakota	0	0	0
Ohio	7,941	4,205	12,146
Oklahoma	216	13	229
Oregon	193	D	D
Pennsylvania	2,157	901	3,058
Rhode Island	399	77	476
South Carolina	1,124	131	1,255
South Dakota	160	D	D
Tennessee	347	61	408
Texas	247	453	700
Utah	12	D	D
Vermont	1,392	0	1,392
Virginia	398	74	472
Washington	208	D	D
West Virginia	0	0	0
Wisconsin	2,944	208	3,152
Wyoming	0	D	D

Source: U.S. Bureau of Labor Statistics

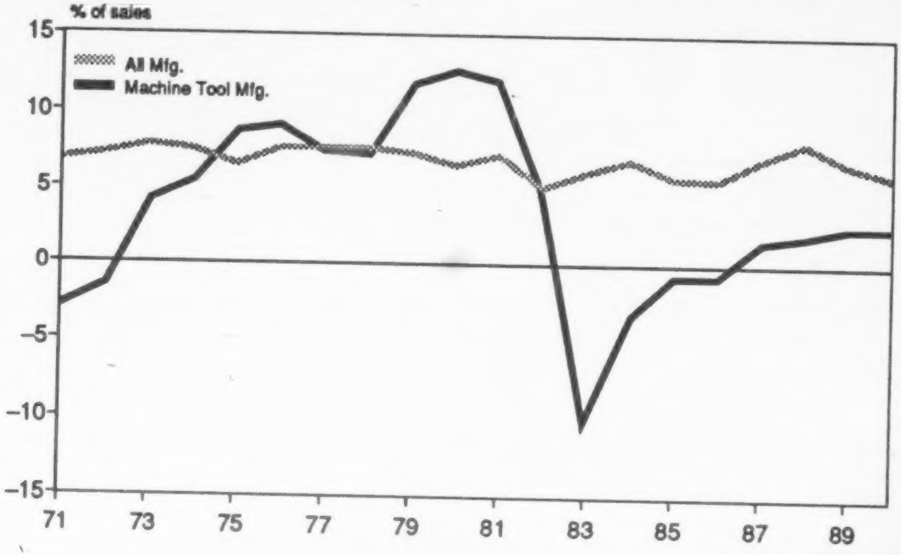
Distribution of Firms by Size of Work Force, 1987



	Total # U.S. Machine Tool Firms	Metal Cutting Industry	Metal Forming Industry
TOTAL	624	417	207
Firms with an average of:			
1 – 4 employees	27	22	5
5 – 9 employees	71	52	19
10–19 employees	174	111	63
20–49 employees	160	111	49
50–99 employees	96	58	38
100–249 employees	58	36	22
250–499 employees	25	17	8
500–999 employees	9	6	3
1,000–2,499 employees	3	3	0
2,500 employees or more	1	1	0

Source: 1987 Census of Manufactures

Net Income Before Taxes



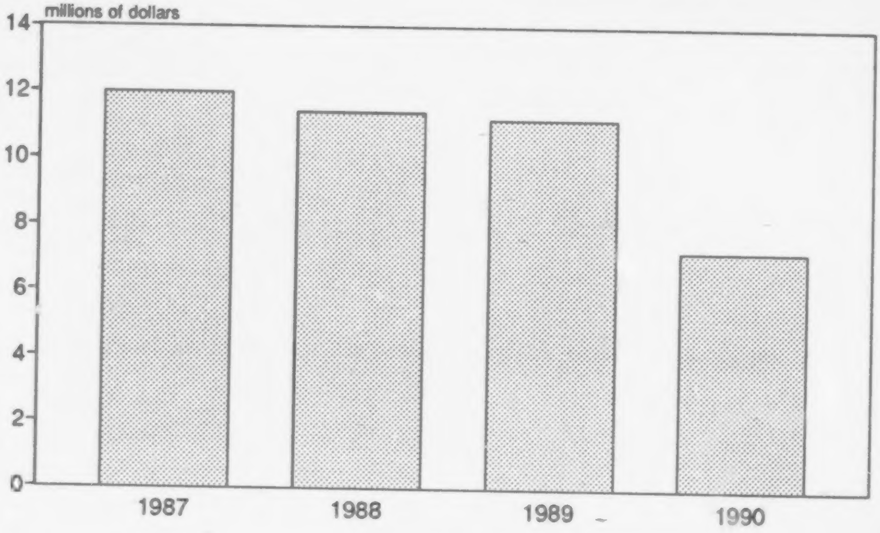
Year	As Percent of Sales All Manufacturers	 Machine Tool Manufacturers	As Percent of Assets All Manufacturers	 Machine Tool Manufacturers
1971	7.0%	–2.7%	8.7%	–2.7%
1972	7.4	–1.3	9.5	–1.4
1973	8.0	4.3	11.0	4.8
1974	7.7	5.6	10.7	7.2
1975	6.7	8.9	8.8	12.7
1976	7.8	9.3	10.6	12.3
1977	7.8	7.6	13.5	12.8
1978	7.8	7.4	10.7	11.8
1979	7.5	12.0	11.1	16.9
1980	6.7	12.9	9.5	19.4
1981	7.4	12.2	10.5	18.0
1982	5.3	5.0	6.7	6.1
1983	6.3	–9.6	7.9	–8.7
1984	7.1	–3.2	8.9	–3.4
1985	5.9	–0.8	7.1	–0.7
1986	5.8	–0.6	6.5	(b)
1987	7.2(a)	1.7	8.0(a)	2.1
1988	8.3(a)	2.1	9.5(a)	2.5
1989	6.9(a)	2.7	7.8(a)	4.6
1990	6.1	2.7	6.2	3.9

Sources: U.S. Department of Commerce, Bureau of the Census, "Quarterly Financial Report for Manufacturing Corporations" and NMTBA

Note: (a) – Excludes corporations with less than $250,000 in assets, (b) – Net income before taxes was less than 0.1%

	Net operating income to net sales	Income after taxes to net sales	Income after taxes to total assets	Income after taxes to average net worth	Depreciation & amortization to net sales	Inventory turnover	Current assets to current liabilities
Machine Tools	4.2%	1.7%	2.3%	4.6%	2.0%	3.4x	1.9x
All Manufacturing Corp.	6.1	4.0	4.4	10.8	3.9	7.0	1.4
Durable Goods	4.5	3.1	3.4	8.1	3.7	5.6	1.5
Primary Iron & Steel	4.0	1.0	1.3	7.1	3.5	6.0	1.7
Primary Nonferrous Metals	6.4	4.1	4.9	10.5	3.7	7.5	1.6
Electrical & Electronic Equip.	5.7	3.3	3.5	8.2	3.7	5.1	1.4
Industrial Machinery	4.5	4.3	4.3	8.3	4.2	5.6	1.7
Transportation Equip. (including Motor Vehicles)	1.3	1.3	1.4	3.7	3.8	5.0	1.2
Motor Vehicle & Equip.	–1.4	–0.3	–0.3	–0.8	4.2	13.1	1.2
Stone, Clay, & Glass Prod.	6.3	2.0	1.8	5.6	4.7	7.9	1.3
Nondurable Goods	7.7	4.9	5.3	13.4	4.0	9.1	1.3
Food & Kindred Prod.	8.5	4.0	5.3	16.2	2.5	9.2	1.2
Textile Mill Prod.	5.6	0.8	1.0	3.3	3.7	5.9	2.1
Paper & Allied Prod.	8.9	4.2	4.3	10.4	4.8	9.3	1.6
Chemicals & Allied Prod.	8.9	8.1	7.5	17.4	4.5	7.1	1.3
Petroleum & Coal Prod.	6.3	5.6	5.5	12.8	5.9	15.6	1.0
Rubber & Misc. Plastic Prod.	4.5	1.8	2.6	7.0	3.4	7.5	1.3

Sources: U.S. Department of Commerce, Bureau of the Census, "Quarterly Financial Report for Manufacturing Corporations" and NMTBA



Fiscal Years

(thousands of dollars)

	1987	1988	1989	1990
Saws and filing machines	$ 4,003	$ 4,087	$ 1,831	$ 3,671
Machining centers and way type machines	23,245	16,333	5,264	17,548
Electrical and ultrasonic erosion machines	3,567	1,187	2,303	538
Boring machines	3,935	323	28,676	4,035
Broaching machines	413	117	117	38
Drilling machines and tapping machines	2,944	9,969	2,271	2,546
Gear cutting and finishing machines	362	1,307	939	432
Grinding machines	20,838	18,149	16,776	6,916
Lathes	25,968	17,052	17,275	17,512
Milling machines	10,094	13,575	9,739	4,674
Planers and shapers	133	2,509	425	0
Misc. machine tools	3,659	6,109	3,777	3,671
TOTAL METAL CUTTING MACHINE TOOLS	99,161	90,717	89,393	61,581
Bending and forming machines	9,436	4,590	9,246	5,382
Hydraulic and pneumatic presses	5,457	4,718	507	431
Mechanical presses, power driven	865	3,345	3,107	709
Manual presses	463	392	132	342
Punching and shearing machines	2,783	7,920	8,282	4,114
Forging machinery and hammers	748	924	553	198
Wire and metal ribbon forming machines	406	200	40	0
Riveting machines	70	314	387	101
Misc. secondary forming & cutting mach.	561	1,038	404	61
TOTAL METAL FORMING MACHINE TOOLS	20,789	23,441	22,658	11,338
TOTAL MACHINE TOOLS	119,950	114,158	112,051	72,919

Source: Department of Defense, OASD (Comptroller), "Military Prime Contract Awards, by Service Category and Federal Supply Classification"

(1982 = 100)

Year	All Machine Tools	Metal Cutting	Metal Forming
1961	20.9	21.4	19.6
1962	21.4	21.8	20.1
1963	21.4	21.9	20.2
1964	22.3	22.8	20.9
1965	23.5	24.0	22.1
1966	25.0	25.5	23.6
1967	26.5	27.1	24.7
1968	27.5	28.0	25.7
1969	28.4	29.0	26.5
1970	30.1	30.8	28.6
1971	31.2	31.8	29.9
1972	32.1	32.6	31.0
1973	34.3	34.8	32.9
1974	40.9	41.2	40.0
1975	48.0	48.1	47.5
1976	52.0	51.8	52.6
1977	56.4	56.0	57.5
1978	63.4	62.8	64.9
1979	72.8	72.4	74.2
1980	85.2	85.1	85.7
1981	93.7	93.6	94.0
1982	100.0	100.0	100.0
1983	102.3	102.1	102.7
1984	104.7	104.7	104.7
1985	107.2	107.3	107.0
1986	109.4	109.6	108.7
1987	111.9	112.6	110.2
1988	115.9	117.4	113.2
1989	122.0	123.4	118.1
1990	129.5	129.8	128.7

Sources: U.S. Department of Labor, Bureau of Labor Statistics; NMTBA

Note: The index for all machine tools is an average of the cutting and forming index, weighted by NMTBA shipment data.

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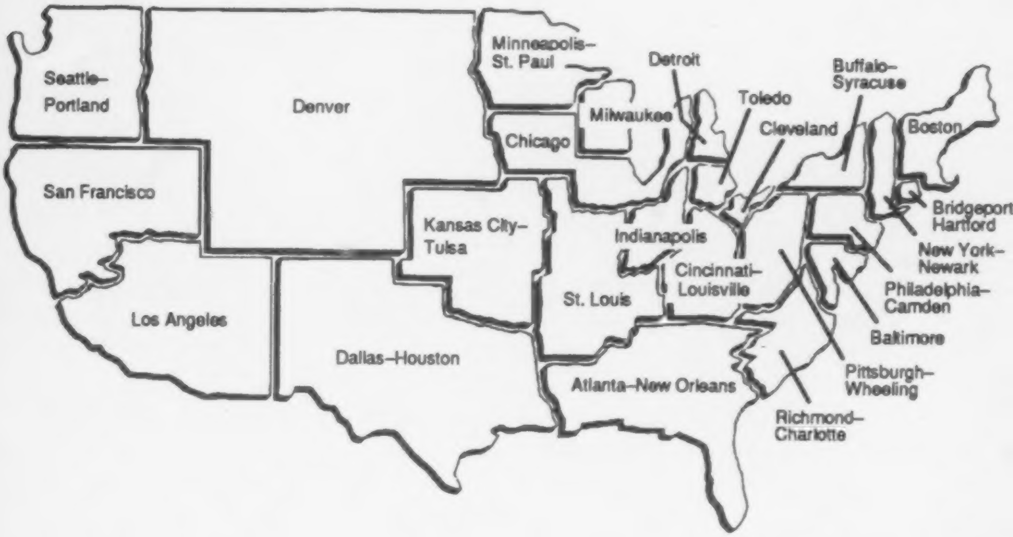
DISTRIBUTION OF MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES

Geographical
1989


Seattle–Portland
Denver
Minneapolis–St. Paul
Detroit
Buffalo–Syracuse
Toledo
Milwaukee
Cleveland
Boston
Chicago
San Francisco
Bridgeport–Hartford
Kansas City–Tulsa
Indianapolis
New York–Newark
Cincinnati–Louisville
Philadelphia–Camden
St. Louis
Los Angeles
Baltimore
Dallas–Houston
Pittsburgh–Wheeling
Atlanta–New Orleans
Richmond–Charlotte

Area	METAL CUTTING Number	METAL CUTTING % of total in area	METAL FORMING Number	METAL FORMING % of total in area
1. Boston	104,799	5.6	23,414	5.1
2. Bridgeport–Hartford	57,266	3.1	13,681	3.0
3. New York–Newark	63,751	3.4	15,605	3.4
4. Buffalo–Syracuse	54,438	2.9	12,919	2.8
5. Philadelphia–Camden	140,483	7.5	37,566	8.2
6. Pittsburgh–Wheeling	42,347	2.3	8,176	1.8
7. Baltimore	15,956	0.9	3,944	0.9
8. Richmond–Charlotte	87,056	4.7	22,605	5.0
9. Atlanta–New Orleans	146,313	7.8	39,049	8.6
10. Cleveland	69,070	3.7	15,521	3.4
11. Toledo	21,653	1.2	5,997	1.3
12. Cincinnati–Louisville	65,054	3.5	14,792	3.2
13. Detroit	89,230	4.8	17,687	3.9
14. Indianapolis	45,786	2.4	10,450	2.3
15. Chicago	214,174	11.4	54,059	11.9
16. Milwaukee	67,795	3.6	17,777	3.9
17. Minneapolis–St. Paul	45,362	2.4	12,281	2.7
18. St. Louis	60,185	3.2	17,068	3.7
19. Kansas City–Tulsa	45,455	2.4	10,099	2.2
20. Dallas–Houston	94,821	5.1	21,436	4.7
21. Denver	43,379	2.3	10,129	2.2
22. Seattle–Portland	40,712	2.2	8,602	1.9
23. San Francisco	71,579	3.8	20,065	4.4
24. Los Angeles	184,089	9.8	43,106	9.5
Total	1,870,753	100.0	456,028	100.0

Source: 14th American Machinist Inventory

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DISTRIBUTION OF MANUFACTURING TECHNOLOGY IN U.S. METALWORKING INDUSTRIES

Age of Machine
1989

Type of equipment	Total Units	0–4 Years	5–9 Years	10–19 Years	20+ Years
METAL CUTTING MACHINES	1,870,753	292,163	449,681	640,864	488,045
NC Turning Machines	74,077	30,949	26,048	14,999	2,081
Non–NC Turning Machines	330,357	28,526	52,497	121,836	127,498
NC Boring Machines	10,688	2,917	3,376	3,039	1,356
Non–NC Boring Machines	37,372	2,688	6,239	14,449	13,996
NC Drilling Machines, all types	10,383	2,921	2,823	3,459	1,180
Non–NC Drilling Machines	274,623	31,103	60,017	100,811	82,692
NC Machining Centers (w/ATC)	53,585	23,813	19,548	8,729	1,495
NC Milling Machines	28,260	10,064	11,357	5,771	1,068
Non–NC Milling Machines	220,846	27,354	53,609	82,484	57,399
NC Gear Cutting Machines	804	443	98	89	174
Non–NC Gear Cutting & Finishing Machines	28,705	911	1,994	10,553	15,247
NC Grinding Machines	12,747	5,285	3,341	3,111	1,010
Non–NC Grinding Machines	422,100	57,791	104,487	148,143	111,679
Honing, Lapping, Polishing Machines	48,537	5,157	13,369	19,727	10,284
Station–type Metal Cutting Machines	13,250	1,799	3,936	5,484	2,031
Broaching Machines, All Types	16,698	1,785	2,645	5,335	6,933
Tapping Machines	31,950	4,285	10,323	10,511	6,831
Threading Machines (not mill, grind, roll)	9,533	1,218	1,428	3,462	3,425
Cutoff & Sawing Machines	204,654	40,900	60,754	67,147	35,853
Waterjet Machines	1,255	178	207	850	20
NC Laser & Thermal Cutting Machines	4,467	2,550	1,329	483	105
Non–NC Thermal Cutting Mach. (incl plasma)	6,173	2,812	1,359	1,468	534
Electrical Machining Units	19,036	5,894	6,340	5,502	1,300
All Other NC Metal Cutting Machines	2,061	289	708	722	342
All Other Non–NC Metal Cutting Machines	8,592	531	1,849	2,700	3,512
METAL FORMING MACHINE TOOLS	456,028	51,593	94,847	171,002	138,586
NC Punching & Shearing Machines	9,830	4,015	3,440	2,014	361
Non–NC Punching & Shearing Machines (power)	76,260	8,965	15,188	29,061	23,046
NC Bending & Forming Machines, All Types	7,195	3,118	2,386	1,183	508
Non–NC Bending & Forming Mach. (power)	81,608	8,177	18,435	32,995	22,001
Mechanical Presses (power)(not forge)	150,570	9,870	21,426	61,046	58,228
Hydraulic Presses (not forge)	49,691	7,406	13,635	17,957	10,693
Pneumatic Presses	24,889	3,960	9,031	7,953	3,945
Coil–processing Systems	13,333	1,295	3,454	5,031	3,553
Sheet– and Plate–processing Systems	1,321	242	475	369	235
Forging Machines	15,736	1,266	1,776	3,992	8,702
Die Casting Machines (hot & cold chamber)	3,179	421	1,124	1,004	630
Multiple–slide Forming Machines	6,525	913	1,310	2,398	1,904
Threadrolling Machines	6,902	729	968	2,521	2,684
All Other NC Metal Forming Machines	863	381	175	166	141
All Other Non–NC Metal Forming Machines	8,126	835	2,024	3,312	1,955

continued

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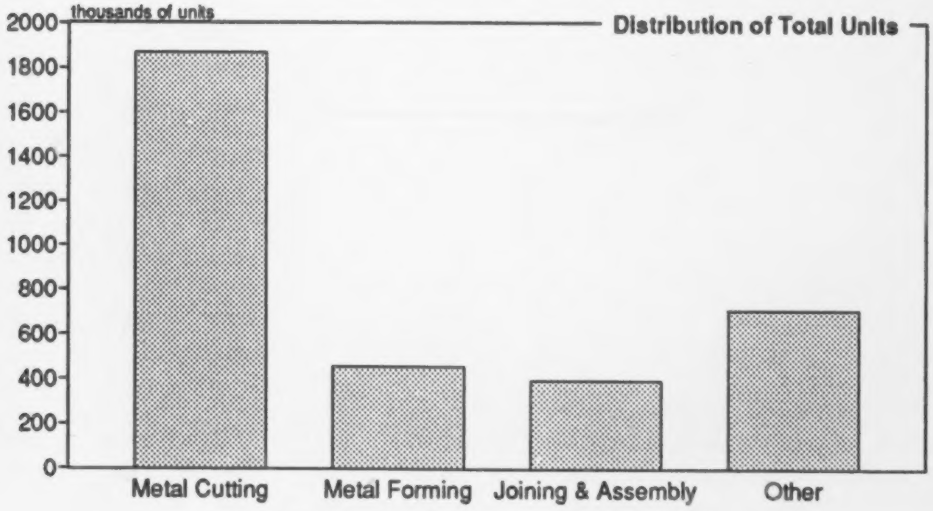
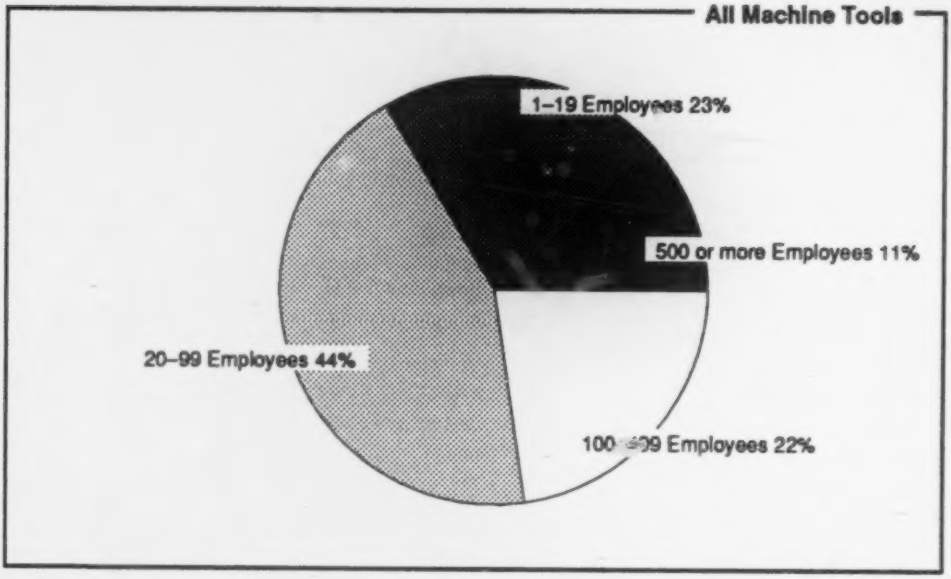
DISTRIBUTION OF MANUFACTURING TECHNOLOGY IN U.S. METALWORKING INDUSTRIES

Age of Machine
1989
(continued)

Type of equipment	Total Units	0–4 Years	5–9 Years	10–19 Years	20+ Years
JOINING & ASSEMBLY EQUIPMENT	395,273	83,208	135,951	122,287	53,827
Auto Assembly Machines	21,718	7,875	7,233	4,409	2,201
Riveting Machines (not portable)	26,792	3,467	6,874	10,489	5,962
Electric Arc Welding Equipment	245,733	54,113	92,722	75,247	23,651
Electric Resistance Welding Equipment	64,911	9,885	16,058	21,324	17,644
Energy Beam Welding	1,454	623	321	467	43
Gas Welding Machines (not hand)	7,116	1,750	2,716	2,137	513
Brazing Systems (all types, incl. furnaces)	20,092	3,654	7,264	5,778	3,396
Metallizing Equipment (gas & plasma)	7,457	1,841	2,763	2,436	417
OTHER EQUIPMENT	712,217	349,926	198,763	116,624	46,904
Plastic Molding Machines	25,725	5,652	8,114	8,928	3,031
Inspection & Measuring Machines	98,533	28,701	34,736	25,844	9,252
Heat Treating Equipment	47,845	7,470	11,442	17,956	10,977
Baking & Drying Ovens	45,426	9,512	15,456	15,342	5,116
Cleaning & Finishing Equipment	152,102	36,828	53,859	44,197	17,218
Robots	13,126	7,984	4,023	682	437
Computer Workstations	329,460	253,779	71,133	3,675	873

Source: 14th American Machinist Inventory





Type of equipment	Total Units	# of Employees 1–19	20–99	100–499	500 or more
TOTAL METAL CUTTING MACHINES	1,870,753	23%	45%	21%	11%
NC turning machines	74,077	16	42	26	16
Non–NC turning machines	330,357	22	45	21	11
NC boring machines	10,688	13	32	29	26
Non–NC boring machines	37,372	20	47	21	12
NC drilling machines	10,383	19	39	28	15
Non–NC drilling machines	274,623	24	45	21	11
NC machining centers	53,585	16	50	22	11
NC milling machines	28,260	26	42	15	17
Non–NC milling machines	220,846	25	48	19	8
NC gear–cutting machines	804	22	21	45	12
Non–NC gear cut & finish machines	28,705	13	50	31	6
NC grinding machines	12,747	21	37	24	17
Non–NC grinding machines	422,100	24	44	22	10
Honing, lapping, polishing machines	48,537	20	43	22	14
Station–type metal cutting machines	13,250	17	21	20	43
Broaching machines	16,698	16	46	24	15
Tapping machines	31,950	29	43	20	7
Threading machines	9,533	23	47	22	8
Cutoff & sawing machines	204,654	28	43	18	10
Waterjet machines	1,255	7	73	9	10
NC laser and thermal cutting units	4,467	27	40	25	8
Non–NC thermal cutting machines	6,173	23	57	15	5
Electrical machining units	19,036	22	42	17	20
Other NC metal cutting machines	2,061	11	37	41	11
Other non–NC metal cutting machines	8,592	22	42	36	0

(continued)

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DISTRIBUTION OF MANUFACTURING TECHNOLOGY IN U.S. METALWORKING INDUSTRIES

Plant Size
1989
(continued)

		# of Employees			
Type of equipment	Total Units	1–19	20–99	100–499	500 or more
TOTAL METAL FORMING MACHINES	456,028	23%	41%	26%	10%
NC punching & shearing machines	9,830	21	40	25	14
Non–NC punching & shearing machines	76,260	27	45	20	8
NC bending & forming machines	7,195	16	46	20	18
Non–NC bending & forming machines	81,608	27	42	21	11
Mechanical presses	150,570	22	40	29	9
Hydraulic presses	49,691	25	41	25	9
Pneumatic presses	24,889	25	41	25	10
Coil–processing systems	13,333	25	36	27	12
Sheet– & plate–processing systems	1,321	21	21	42	16
Forging machines	15,736	10	31	34	25
Die casting machines	3,179	26	31	34	9
Multiple–slide forming machines	6,525	19	52	21	8
Thread–rolling machines	6,902	8	43	34	15
Other NC metal forming machines	863	43	31	20	6
Other non–NC metal forming machines	8,126	18	34	41	7
Total NC cutting machines	204,468	18	43	23	16
Total NC forming machines	17,888	20	42	23	15
Total NC machine tools	222,356	18	43	23	16
TOTAL MACHINE TOOLS	2,326,781	23	44	22	11
TOTAL JOINING & ASSEMBLY EQUIPMENT	395,273	20	42	27	11
Automatic assembly machines	21,718	9	25	43	23
Riveting machines	26,792	12	35	40	13
Electric Arc Welding Equipment	245,733	21	47	25	7
Electric Resistance Welding Equipment	64,911	21	35	26	19
Energy beam welding	1,454	11	19	27	43
Gas welding machines	7,116	24	35	31	10
Brazing systems	20,092	25	36	31	8
Metallizing equipment	7,457	24	37	18	21
OTHER EQUIPMENT	712,217	12	29	23	36
Plastic molding machines	25,725	14	34	42	11
Inspection & measuring machines	98,533	16	40	28	16
Heat treating equipment	47,845	14	37	27	22
Baking & drying ovens	45,426	14	36	34	15
Cleaning & finishing equipment	152,102	21	40	26	13
Robots	13,126	13	36	28	24
Computer workstations	329,460	6	18	17	59

Source: 14th American Machinist Inventory

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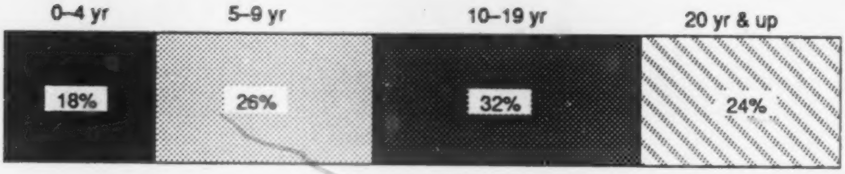
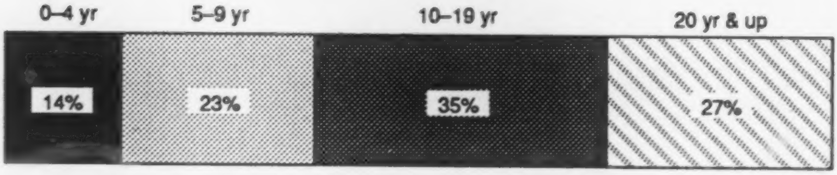
Age of Machine and Plant Size, 1989

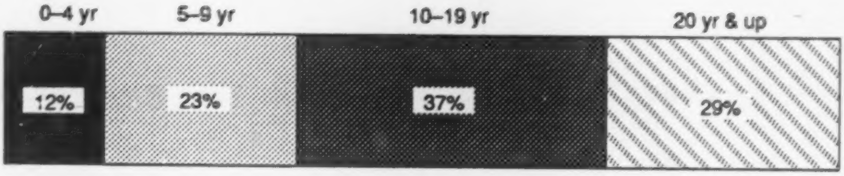
1–19 Employees



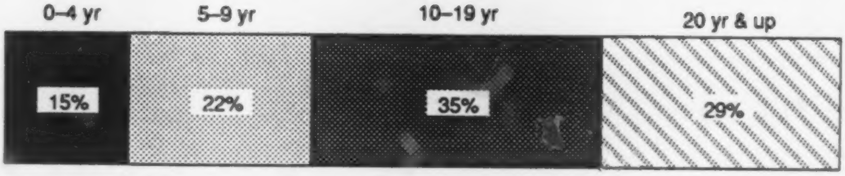
20–99 Employees



100–499 Employees



500 or More Employees



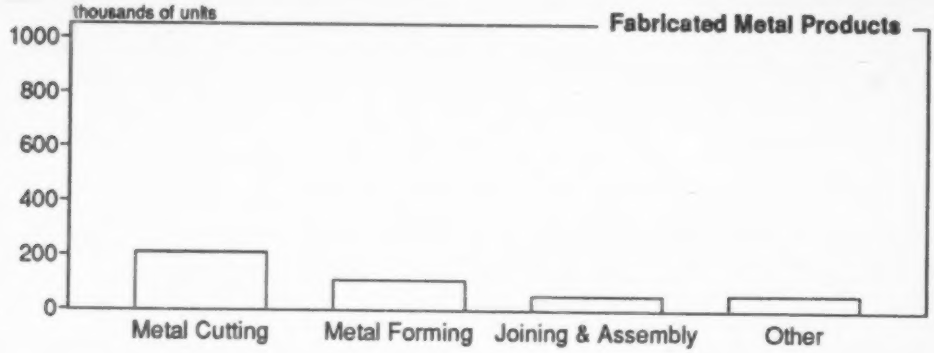
Age of Machine and Plant Size, 1989

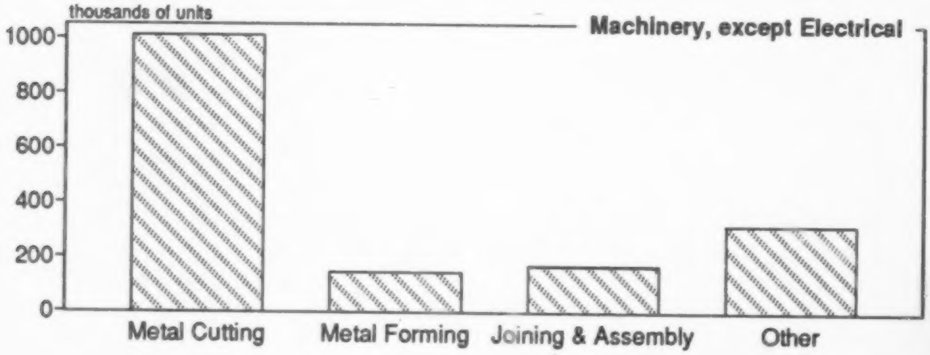
Type of equipment	Total Units	0–4 yr	5–9 yr	10–19 yr	20 yr & up
Plants with 1–19 employees					
Total metal cutting machines	433,902	20%	26%	31%	24%
Total metal forming machines	106,576	13	27	36	24
Total NC cutting machines	36,430	44	34	17	4
Total NC forming machines	3,575	50	31	14	4
Total NC machine tools	40,005	45	34	17	4
Total machine tools	540,478	18	26	32	24
Total joining & assembly	78,646	27	30	30	13
Total other equipment	86,027	39	32	20	9
Total equipment	705,151	22	27	30	21
Plants with 20–99 employees					
Total metal cutting machines	833,994	15%	24%	35%	26%
Total metal forming machines	186,612	11	19	37	33
Total NC cutting machines	88,346	39	35	22	4
Total NC forming machines	7,559	44	29	21	6
Total NC machine tools	95,905	40	35	21	4
Total machine tools	1,020,606	14	23	35	27
Total joining & assembly	166,914	21	34	32	13
Total other equipment	208,037	41	29	22	9
Total equipment	1,395,557	19	25	33	23
Plants with 100–499 employees					
Total metal cutting machines	396,818	13%	24%	36%	27%
Total metal forming machines	116,760	10	20	42	29
Total NC cutting machines	47,767	37	35	22	6
Total NC forming machines	4,056	31	43	20	6
Total NC machine tools	51,823	37	36	21	6
Total machine tools	513,578	12	23	37	28
Total other equipment	164,524	38	34	22	7
Total equipment	786,271	18	27	33	21
Plants with 500 or more employees					
Total metal cutting machines	206,039	15%	23%	36%	26%
Total metal forming machines	46,080	12	16	31	41
Total NC cutting machines	31,925	43	34	21	2
Total NC forming machines	2,698	42	37	17	5
Total NC machine tools	34,623	43	34	21	2
Total machine tools	252,119	15	22	35	29
Total joining & assembly	41,544	16	30	32	23
Total other equipment	253,629	67	22	8	4
Total equipment	547,292	39	23	22	17

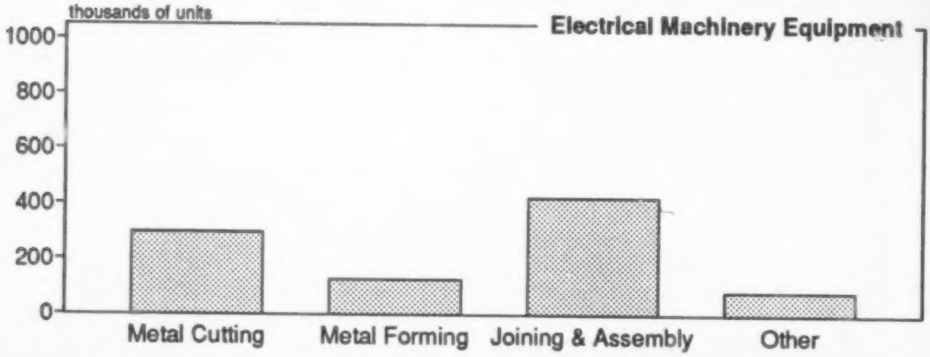
Source: 14th American Machinist Inventory

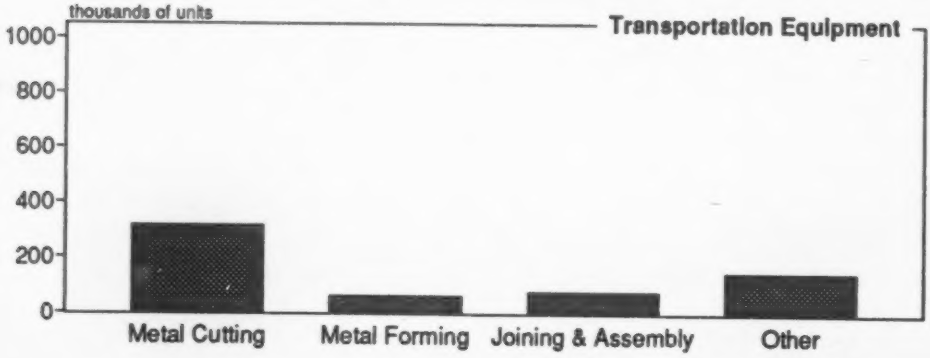
DISTRIBUTION OF MANUFACTURING TECHNOLOGY IN U.S. METALWORKING INDUSTRIES

Machine Category by Industry, 1989









DISTRIBUTION OF MANUFACTURING TECHNOLOGY IN U.S. METALWORKING INDUSTRIES

Machine Category by Industry, 1989

SIC	Industry	Metal Cutting	Metal Forming	Joining & Assembly	Other Equipment
25	METAL FURN, FIXTURES	6,043	5,186	4,182	2,199
33	PRIMARY METALS	5,957	2,174	1,205	2,350
34	FABRICATED METAL PRODUCTS	210,863	109,836	54,090	58,129
341	Cans & Shipping Containers	2,019	2,013	1,105	888
342	Cutlery, handtools, hdwr	28,183	12,838	6,416	7,670
343	Heating, plumbing fxtrs	4,776	2,212	1,192	1,405
344	Fab Structural metal pdts	55,706	36,036	27,306	11,585
345	Screw Machine Products	37,731	11,127	1,590	8,107
346	Metal Stampings	31,240	28,492	6,530	10,243
347	Coating and Engraving	5,532	770	1,147	3,961
348	Ordnance accessories	3,524	565	426	1,004
349	Misc fab metal products	39,369	15,266	7,967	10,865
35	MACHINERY EXCEPT ELECTRICAL	1,011,582	145,427	170,148	319,780
351	Engines and turbines	10,146	1,138	1,133	4,062
352	Farm, garden machinery	33,999	12,873	18,563	13,332
353	Contruction, mining, matl hdlg	77,443	15,846	33,561	18,291
354	Metalworking machinery	221,868	18,955	13,163	39,717
355	Special industry machinery	103,958	13,161	16,112	18,868
356	General industrial machinery	154,921	21,780	24,500	41,730
357	Office, computing machinery	64,036	10,625	12,445	31,902
358	Refrigeration service machinery	49,120	16,431	14,889	8,433
359	Misc machinery, except elec	239,859	19,938	21,690	37,247
36	ELECTRICAL MACHINERY, EQUIP.	298,464	126,744	425,208	83,746
361	Transformer, distribution equipment	23,851	9,938	6,430	7,032
362	Elec industrial apparatus	48,799	13,855	10,481	19,936
363	Household appliances	12,052	11,214	7,714	8,282
364	Electric lighting, wiring	34,219	14,670	7,865	15,172
365	Radio, TV equipment	33,602	33,495	12,150	10,609
366	Communications equipment	4[illegible],444	11,543	9,567	48,585
367	Electronic Components	60,044	19,457	11,887	37,711
369	Misc electrical equipment	26,102	9,702	8,765	13,569
37	TRANSPORTATION EQUIPMENT	315,648	63,345	77,893	148,336
371	Motor vehicles and parts	115,141	31,198	33,414	29,582
372	Aircraft and parts	130,962	17,953	15,638	97,368
373	Ships and boats	28,760	7,882	18,181	8,351
374	Railroad equipment	13,505	1,417	2,383	2,212
375	Mtrcycles, bicycles, parts	1,699	1,329	1,017	866
376	Guided missiles, space veh	5,361	452	686	2,057
379	Misc transportation equipment	6,406	996	2,049	740
38	PRECISION INSTRUMENTS	20,715	2,967	2,937	11,947
39	MISC MFG INDUSTRIES	1,481	349	442	1,521
TOTAL		1,870,753	456,028	395,273	712,217

Source: 14th American Machinist Inventory

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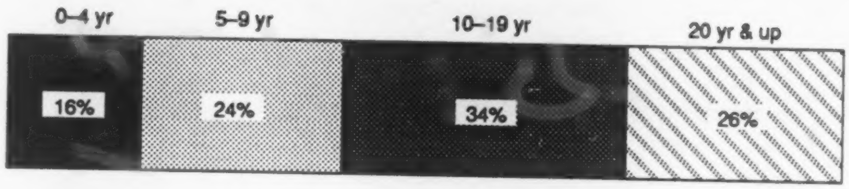
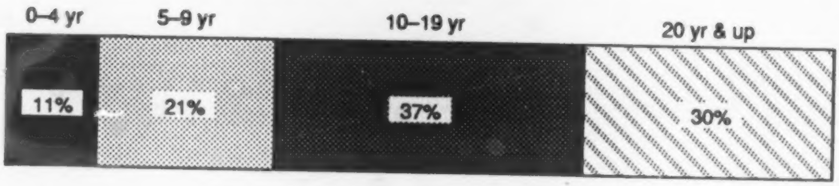
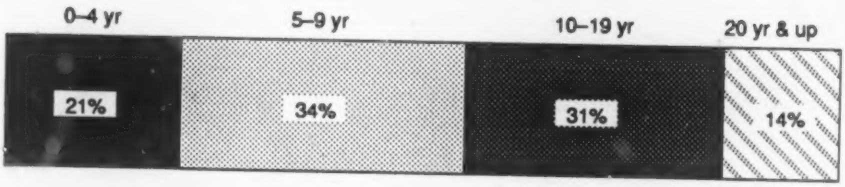
Metal Cutting Machine Tools in Use, 1989



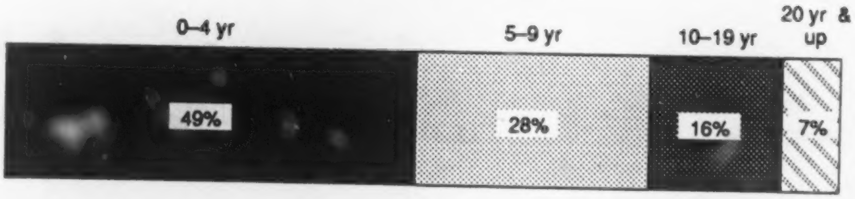
Metal Forming Machine Tools in Use, 1989



Joining & Assembly Machines in Use, 1989



Other Equipment in Use, 1989



Age and Type of Machine by Industry, 1989

SIC	Industry	Total Units	0–4 yr	5–9 yr	10–19 yr	20 yr & up
	Metal Cutting Machine Tools in Use, 1989					
25	Metal furn, fixtures	6,043	1%	2%	76%	21%
33	Primary metals	5,957	14	21	32	33
34	Fabricated metal products	210,863	15	22	34	29
35	Machinery, except electrical	1,011,582	15	24	34	27
36	Electrical machinery, equipment	298,464	19	27	34	20
37	Transportation equipment	315,648	15	24	35	26
38	Precision instruments	20,715	14	31	32	24
39	Misc mfg industries	1,481	16	14	50	20
	Total	1,870,753	16	24	34	26
	Metal Forming Machine Tools in Use, 1989					
25	Metal furn, fixtures	5,186	3%	2%	66%	29%
33	Primary metals	2,174	7	21	54	19
34	Fabricated metal products	109,836	10	16	40	35
35	Machinery, except electrical	145,427	13	21	35	31
36	Electrical machinery, equipment	126,744	13	26	37	24
37	Transportation equipment	63,345	8	20	36	36
38	Precision instruments	2,967	5	34	37	24
39	Misc mfg industries	349	5	6	42	47
	Total	456,028	11	21	37	30
	Joining and Assembly Machines in Use, 1989					
25	Metal furn, fixtures	4,812	1%	5%	22%	73%
33	Primary metals	1,205	20	34	43	2
34	Fabricated metal products	54,090	20	31	33	16
35	Machinery, except electrical	170,148	21	36	32	11
36	Electrical machinery, equipment	83,746	24	33	28	41
37	Transportation equipment	77,893	19	38	30	13
38	Precision instruments	2,937	15	39	33	13
39	Misc mfg industries	442	15	25	43	17
	Total	395,273	21	34	31	14
	Other Equipment in Use, 1989					
25	Metal furn, fixtures	2,129	11%	66%	6%	16%
33	Primary metals	2,350	27	23	22	27
34	Fabricated metal products	58,129	33	27	27	13
35	Machinery, except electrical	319,780	53	27	14	6
36	Electrical machinery, equipment	168,025	39	36	19	7
37	Transportation equipment	148,336	62	19	14	5
38	Precision instruments	11,947	30	50	16	4
39	Misc mfg industries	1,521	56	18	22	5
	Total	712,217	49	28	16	7

Source: 14th American Machinist Inventory

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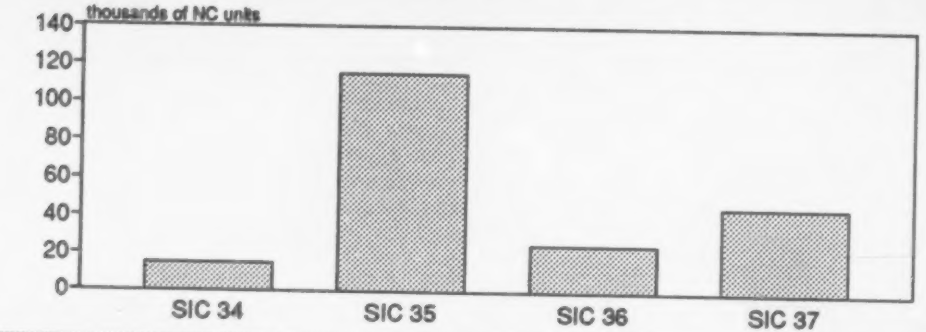
DISTRIBUTION OF NUMERICALLY CONTROLLED MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES

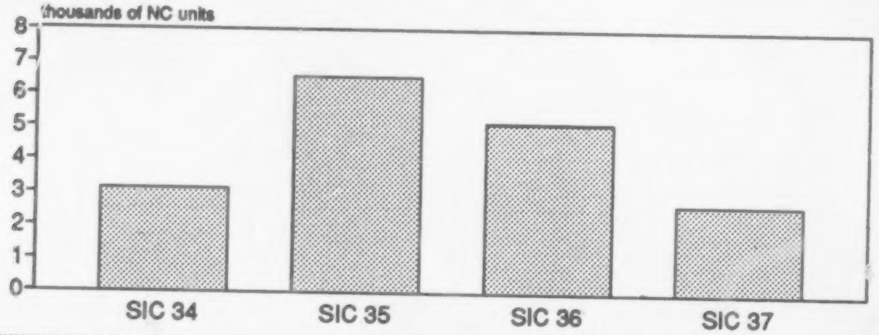
Metal Cutting
1989



SIC	Industry	Total Units	NC Units	% NC of Total	% NC 0–9 yr
25	Metal furn, fixtures	6,043	50	0.8%	23.5%
33	Primary metals	5,957	374	6.3	18.3
34	Fabricated metal products	210,863	14,899	7.1	19.1
35	Machinery, except electrical	1,011,582	115,432	11.4	29.3
36	Electrical machinery, equipment	298,464	25,055	8.4	18.3
37	Transportation equipment	315,618	45,865	14.5	37.7
38	Precision instruments	20,715	2,713	13.1	29.3
39	Misc mfg industries	1,481	80	5.4	17.9
	Total	1,870,753	204,468	10.9	27.6

DISTRIBUTION OF NUMERICALLY CONTROLLED MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES

Metal Forming
1989



SIC	Industry	Total Units	NC Units	% NC of Total	% NC 0–9 yr
25	Metal furn, fixtures	5,186	205	4.0%	83.0%
33	Primary metals	2,174	2	0.1	0.3
34	Fabricated metal products	109,836	3,130	2.8	11.1
35	Machinery, except electrical	145,427	6,558	4.5	13.2
36	Electrical machinery, equipment	126,744	5,153	4.1	10.5
37	Transportation equipment	63,345	2,698	4.3	15.2
38	Precision instruments	2,967	134	4.5	11.5
39	Misc mfg industries	349	8	2.3	21.1
	Total	456,028	17,888	3.9	12.2

Source: 14th American Machinist Inventory

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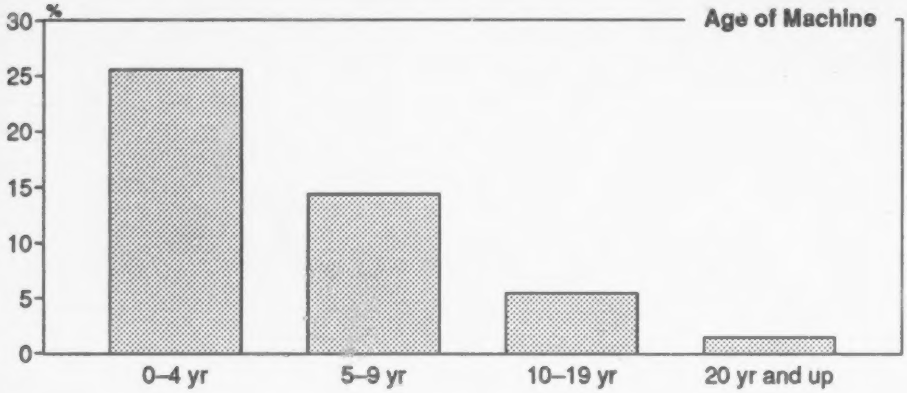
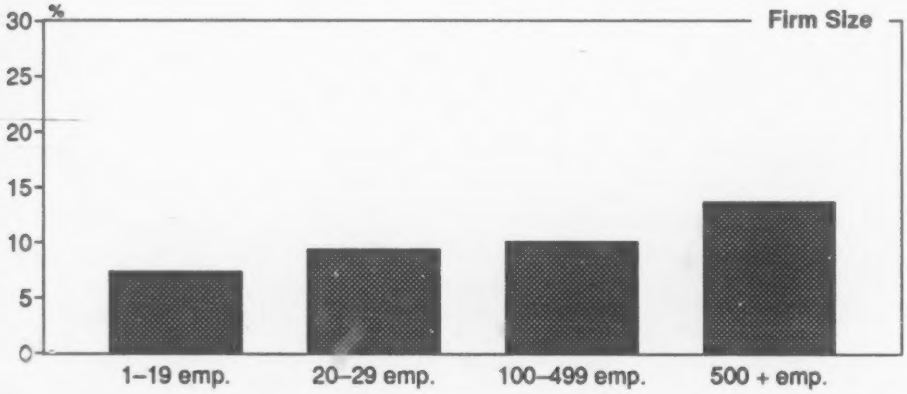
DISTRIBUTION OF NUMERICALLY CONTROLLED MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES

Age of Machine and Firm Size, 1989





Size of Firm (# of Employees)	% of All Machines	0–4 yrs	5–9 yrs	10–19 yrs	20 yrs and up
1 – 19	7.4%	18.1%	9.7%	4.0%	1.3%
20 – 29	9.4	26.0	14.3	5.7	1.5
100 – 499	10.1	30.3	15.8	5.8	2.3
500 +	13.7	40.7	21.6	8.1	1.1
All Firms	9.6	25.6	14.4	5.5	1.5

Source: 14th American Machinist Inventory

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International Machine Tool Statistics	**Section F**

Section Note: Foreign data in this section have been converted into U.S. dollars based on annual average exchange rates. However, because the value of the dollar has risen and fallen sharply in recent years, dollar–denominated figures may show declines (increases) when national currency figures reflect increases (declines). Therefore, when analyzing long term trends it might be advisable to convert dollar–denominated statistics back into national currency terms.

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Production and Trade
1990 estimated

(millions of U.S. dollars)

	PRODUCTION			TRADE		
	Total	Cutting	Forming	Export	Import	Consumption
1. Japan	$10,929.1	$9,001.3	$1,927.8	$3,979.8	$652.0	$7,601.5
2. West Germany	8,733.9	6,238.6	2,495.3	5,016.4	2,131.8	5,849.3
3. USSR (d,g)	c4,580.0	c3,840.0	c740.0	c380.0	c1,700.0	c5,900.0
4. Italy	3,705.9	2,640.8	1,065.0	1,740.0	1,054.3	3,020.2
5. United States	3,326.0	2,319.8	1,006.2	908.3	2,147.9	4,565.6
6. Switzerland (a)	2,930.5	2,328.7	601.8	2,556.9	811.3	1,184.9
7. United Kingdom	1,674.0	1,281.3 E	392.7 E	873.6	932.9	1,733.3
8. France	1,364.8(d)	1,014.3(d)	350.5(d)	538.6	1,627.8	2,454.0
9. East Germany (d,g)	c1,085.0	c875.0	c210.0	c775.0	c290.0	c600.0
10. Spain	1,020.0	722.0	298.0	454.0	527.0	1,093.0
11. China	989.7(d)	716.5(d)	273.2(d)	200.6	358.2	1,147.3
12. Taiwan	943.7	682.8	260.9	640.4	294.2	597.5
13. South Korea	785.1	638.1	147.0	88.0	861.5	1,558.6
14. Yugoslavia	630.0	408.2	221.8	464.6	118.0	283.4
15. Romania (d,g)	c530.7	c463.4	c67.3	c140.6	c86.5	c476.6
16. Canada	368.9(d)	221.5(d)	147.4(d)	101.9	437.6	704.6
17. Brazil	301.0	266.0	35.0	37.4	35.0(d)	298.6
18. Austria	283.7	222.6	61.1	391.2	372.9	265.3
19. Belgium	281.2	35.0	246.2	543.7	601.1	338.6
20. Sweden	251.7	126.3	125.4	289.0	348.1	310.8
21. India	237.3	208.6	28.7	46.2	114.6(d)	305.7
22. Poland (d,g)	c200.0	c155.0	c45.0	c27.5	c25.0	c197.5
23. Czechoslovakia (d,g)	c191.9	c143.1	c48.8	c187.7	c158.5	c162.7
24. Bulgaria (d,g)	c160.0	c150.0	c10.0	c120.0	c75.0	c115.0
25. Hungary (d,g)	97.8	81.2	16.6	88.0	41.3	51.1
26. Netherlands	97.8	49.9	47.9	217.3	381.7	262.2
27. Denmark	80.5	37.2	43.3	95.4	146.0	131.1
28. Singapore (d)	65.7	60.2	5.5	120.5	243.2	188.4
29. Finland (d)	57.8	17.1	40.7	38.1	176.0	195.7
30. Argentina	40.5	27.8	12.8	28.9	26.3	37.9
31. Mexico (d)	21.5	13.9	7.6	10.8	258.0	268.7
32. Portugal (d)	c17.5	c7.0	c10.5	c10.0	c35.0	c42.5
33. Australia (d)	15.6	10.9	4.7	7.8	82.6	90.4
34. Hong Kong (d)	12.0	6.0	6.0	0.5	8.0	19.5
35. South Africa (d)	9.7	1.9	7.8	0.4	116.3	125.6
TOTAL	46,020.5	35,012.0	11,008.5	21,118.6	17,275.6	42,177.5

Sources: NMTBA; American Machinist

Note: Whenever possible, data includes machine tools only, excluding parts and attachments. (a) – data includes parts and accessories, c – circa, rough estimate based on fragmented data, (d) – American Machinist estimates (all other figures provided by national machine tool trade associations or government sources), E – estimated by NMTBA, (g) – country with controlled currency whose official rate may not represent real value. Controlled currencies have been converted as follows: USSR, Bulgaria, Poland and China at 70% of official rate; East Germany at 65% of West German rate; Hungary and Romania at IMF commercial rates.

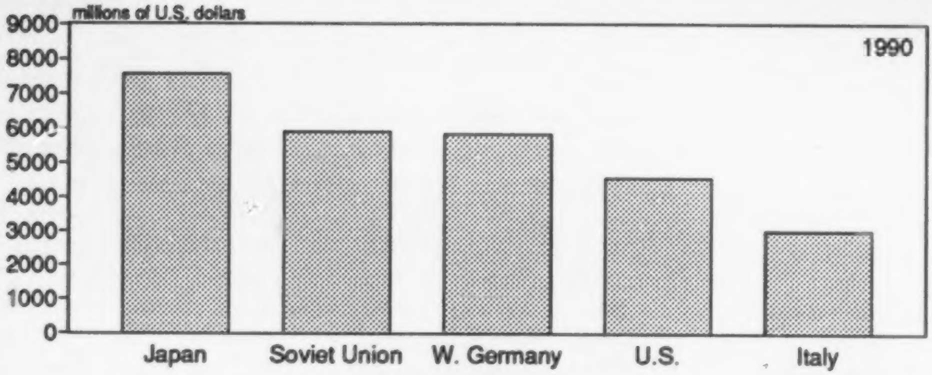
Production and Trade
1989 revised

(millions of U.S. dollars)

	PRODUCTION			TRADE		
	Total	Cutting	Forming	Export	Import	Consumption
1. Japan	$10,058.8	$8,257.5	$1,801.3	$3,928.8	$508.5	$6,638.5
2. West Germany	6,867.7	4,783.5	2,084.2	4,236.8	1,479.2	4,110.1
3. USSR (d,g)	c5,000.0	c4,200.0	c800.0	c380.0	c2,000.0	c6,620.0
4. Italy	3,004.9	2,166.3	838.6	1,472.7	794.6	2,326.8
5. United States	3,453.4	2,391.0	1,002.3	812.3	2,246.3	4,887.4
6. Switzerland	2,247.7	1,796.6	451.1	1,977.5	587.4	857.6
7. United Kingdom	1,483.9	1,109.3 E	374.6 E	653.6	851.5	1,681.8
8. East Germany (d,g)	c1,445.0	c1,165.0	c280.0	c1,270.0	c300.0	c475.0
9. China	1,151.9(d)	912.0(d)	239.9(d)	188.3	486.3	1,449.9
10. Taiwan	1,016.5	791.0	225.8	659.7	370.5	727.3
11. France	879.4	662.8	216.5	415.9	1,110.5	1,574.0
12. Spain	806.7	615.9	190.8	323.7	341.6	824.6
13. South Korea	744.2	602.9	141.4	83.1	786.7	1,447.8
14. Romania (d,g)	c635.1	c554.7	c80.4	c160.7	c118.0	c592.4
15. Yugoslavia	630.0	408.2 E	221.8 E	401.2	125.3	354.1
16. Brazil	461.0	389.0	72.0	30.6	166.9	597.3
17. Canada	361.2(d)	220.0(d)	141.2(d)	78.8	449.7	732.1
18. Poland (d,g)	c320.0	c265.0	c55.0	c28.0	c55.0	c347.0
19. Czechoslovakia (d,g)	c260.0	c193.0	c67.0	c263.7	c226.9	c223.2
20. Austria	227.8	187.3	40.5	266.4	313.1	274.5
21. Sweden	226.0	115.1	110.9	215.8	354.0	364.2
22. Belgium (d)	214.8	33.3	181.5	395.2	450.8	270.4
23. India	210.6	180.6	30.0	30.4	123.3(d)	303.5
24. Bulgaria (d,g)	c175.0	c160.0	c15.0	c137.8	c93.4	c130.6
25. Hungary (d,g)	100.1	80.4	19.7	90.1	65.2	75.2
26. Netherlands (d)	78.9	40.3	38.6	154.9	252.5	176.5
27. Denmark	63.2	29.7	33.5	77.4	104.8	90.6
28. Singapore (d)	53.0	47.0	6.0	130.9	231.5	153.6
29. Argentina (d)	41.6	32.2	9.4	31.3	29.9	40.3
30. Finland (d)	37.3	12.8	24.5	24.5	139.6	152.4
31. Mexico (d)	21.0	13.6	7.4	10.2	203.2	214.0
32. Portugal (d)	c17.5	c7.0	c10.5	c10.0	c35.0	c42.5
33. Australia (d)	12.3	8.7	3.6	6.9	71.0	76.4
34. Hong Kong (d)	12.2	6.1	6.1	0.3	8.6	20.5
35. South Africa (d)	9.6	5.4	4.2	0.1	66.9	76.4
TOTAL	42,328.3	32,443.2	9,885.3	18,947.6	15,547.7	38,928.5

Sources: NMTBA; American Machinist

Note: Whenever possible, data includes machine tools only, excluding parts and attachments. c – circa, rough estimate based on fragmented data, (d) – American Machinist estimates (all other figures provided by national machine tool trade associations or government sources), E – estimated by NMTBA, (g) – country with controlled currency whose official rate may not represent real value. Controlled currencies have been converted as follows: USSR, Bulgaria, Poland and China at 70% of official rate; East Germany at 65% of West German rate; Hungary and Romania at IMF commercial rates.



(millions of U.S. dollars)

	1986	1987	1988	1989	1990
1. Japan	$4,081.5	$3,612.1	$5,638.0	$6,638.5	$7,601.5
2. Soviet Union E	4,897.4	5,303.2	5,806.0	6,620.0	5,900.0
3. West Germany	3,325.6	4,013.8	3,769.1	4,110.1	5,849.3
4. United States	4,230.7	3,904.2	4,037.8	4,887.4	4,565.5
5. Italy	1,001.7	1,753.2	2,189.4	2,326.8	3,020.2
6. France	898.0	1,151.1	1,365.6	1,574.0	2,454.0
7. United Kingdom	1,056.1	1,084.2	1,546.4	1,681.8	1,733.3
8. South Korea	657.0	963.0	1,148.9	1,447.8	1,558.6
9. Switzerland	275.2	576.7	622.5	857.6	1,184.9(a)
10. China	478.7	1,007.0	1,137.8	1,449.9	1,147.3
11. Spain	323.4	606.8	753.6	824.6	1,093.0
12. Canada	421.6	708.4	768.9	732.1	704.6
13. East Germany E	177.5	308.5	443.6	475.0	600.0
14. Taiwan	188.8	410.9	606.6	727.3	597.5
15. Romania E	325.8	619.4	619.2	592.4	476.6
16. Belgium	169.1	206.1	273.7	234.2	338.6
17. Sweden	275.4	342.5	342.4	364.2	310.8
18. India	314.0	291.7	322.4	372.8	305.7
19. Brazil	589.8	612.2	659.4	597.3	298.6
20. Yugoslavia	314.3	356.6	308.4	354.1	283.4
21. Mexico	216.0	267.4	186.0	214.0	268.7
22. Austria	184.2	219.8	283.1	274.5	265.3
23. Netherlands	175.1	229.0	166.8	161.3	262.2
24. Poland E	168.4	428.5	434.4	450.0	197.5
25. Finland	99.5	120.9	114.1	111.0	195.7
26. Singapore	94.6	95.0	43.1	153.6	188.4
27. Czechoslovakia E	153.4	160.0	373.2	223.2	162.7
28. Denmark	134.1	102.5	92.0	90.6	131.1
29. South Africa	59.9	73.7	88.7	76.4	125.6
30. Bulgaria E	213.4	391.0	161.6	130.6	115.0
31. Australia	169.0	177.3	75.6	91.7	90.4
32. Hungary E	136.3	164.0	101.5	88.2	51.1
33. Portugal	32.9	42.3	43.6	42.5	42.5
34. Argentina	44.8	62.3	60.7	40.3	37.9
35. Hong Kong	69.4	70.4	23.6	20.5	19.5

Sources: NMTBA; American Machinist

Note: Whenever possible, data includes machine tools only, excluding parts and attachments. (a) – data includes parts and accessories, E – rough estimate based on fragmented data Country with controlled currency whose official rate may not represent real value. Controlled currencies have been converted as follows: USSR, Bulgaria, Poland and China at 70% of official rate; East Germany at 65% of West German rate; Hungary and Romania at IMF commercial rates.

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(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1980	$58.6	$82.2	$28.0	$112.8	72.9%	47.8%
1981	31.9	69.6	17.2	84.4	82.5	53.8
1982	18.6	39.2	9.0	48.8	80.3	48.4
1983	19.9	20.6	3.3	37.2	55.4	16.7
1984	19.2	22.6	3.0	38.8	58.2	15.7
1985	19.8	31.3	3.7	47.5	66.0	18.7
1986	33.1	16.4	4.7	44.8	36.7	14.3
1987	39.9	38.3	16.0	62.3	61.6	40.0
1988	48.6	44.6	32.6	60.7	73.6	67.0
1989	41.6	29.9	31.3	40.3	74.4	75.2
1990(p)	40.5	26.3	28.9	37.9	69.4	71.4

Source: Asociacion Argentina de Fabricantes de Maquinas–Herramienta, Accesorios Y Afines (AAFMHA)

Note: (p) – preliminary, export and import figures for 1990 are the first 11 months annualized

ARGENTINA Production

(millions of U.S. dollars)

	1987	1988	1989	1990
MACHINE TOOL TOTAL	$39.9	$48.6	$41.6	$40.5
METAL CUTTING TOTAL	31.5	36.9	32.2	27.8
Non–NC lathes	7.7	11.3	6.4	2.9
NC lathes	10.1	11.5	10.9	9.9
Milling machines	2.7	3.0	3.1	4.2
Grinding machines	3.5	3.2	1.6	2.2
Drilling machines	2.1	1.8	1.5	1.6
Machining centers & transfer lines	1.4	2.0	3.5	5.7
Other metal cutting machines	4.1	4.0	5.2	1.2
METAL FORMING TOTAL	8.4	11.7	9.4	12.8
Presses	4.6	6.2	4.8	5.0
Guillotine shears	1.5	1.1	1.5	2.7
Other metal forming machines	2.3	4.4	3.1	5.1

Source: Asociacion Argentina de Fabricantes de Maquinas–Herramienta, Accesorios Y Afines (AAFMHA)

ARGENTINA ***Exports by Destination***

(millions of U.S. dollars)

	1987	1988	1989	1990(i)
TOTAL EXPORTS	$16.0	$32.6	$31.3	$26.5
Bolivia	1.0	0.5	0.2	0.1
Brazil	11.2	22.2	23.5	20.4
Chile	0.5	3.8	2.2	2.0
Colombia	0.3	0.5	0.9	0.8
Mexico	0.1	0.3	0.5	0.6
Peru	1.7	1.5	1.1	0.4
United States	0.4	0.8	0.5	0.3
Uruguay	0.3	0.6	1.1	0.6
Venezuela	0.2	1.1	0.3	0.1
All other countries	0.4	1.2	0.9	1.1

Source: Asociacion Argentina de Fabricantes de Maquinas–Herramienta, Accesorios Y Afines (AAFMHA)

Note: (i) – incomplete, export and import figures for 1990 are the first 11 months only

ARGENTINA ***Exports by Type of Machine***

(millions of U.S. dollars)

	1987	1988	1989	1990(i)
MACHINE TOOL TOTAL	$16.0	$32.6	$31.3	$26.5
Lathes and machining centers	8.1	16.1	14.5	7.5
of which NC	4.0	9.8	9.7	6.9
Milling and boring machines	1.6	2.7	3.9	3.0
Drilling machines	0.6	0.8	0.7	0.8
Sawing and cut–off machines	0.4	0.2	0.1	0.8
Threading machines	0.2	0.1	0.6	0.3
Grinding machines	0.9	2.0	1.0	1.6
Presses (excl. stamping & forging)	1.3	2.3	1.9	3.7
Bending, folding, leveling machines	0.9	2.0	2.7	4.0
Punching and shearing machines	0.5	0.9	1.0	1.9
Other machine tools	1.4	5.5	5.1	2.8

Source: Asociacion Argentina de Fabricantes de Maquinas–Herramienta, Accesorios Y Afines (AAFMHA)

Note: (i) – incomplete, export and import figures for 1990 are the first 11 months only

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ARGENTINA

Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990(i)
TOTAL IMPORTS	$38.3	$44.6	$29.9	$24.1
Italy	14.2	14.9	11.0	7.9
West Germany	8.9	15.2	7.8	5.1
Brazil	1.9	0.8	0.5	2.5
Spain	1.6	1.8	1.1	1.8
United States	2.5	5.3	2.8	1.1
Japan	1.3	2.6	2.4	1.3
Other European Community	2.6	0.3	2.4	0.9
Other Western Europe	3.7	1.2	0.3	0.5
Eastern Europe	0.4	1.0	1.3	1.1
All other countries	1.2	1.5	0.5	1.9

Source: Asociacion Argentina de Fabricantes de Maquinas–Herramienta, Accesorios Y Afines (AAFMHA)

Note: (i) – incomplete, export and import figures for 1990 are the first 11 months only

ARGENTINA

Imports by Type of Machine

(millions of U.S. dollars)

	1987	1988	1989	1990(i)
MACHINE TOOL TOTAL	$38.3	$44.6	$29.9	$24.1
of which NC	4.6	9.0	8.4	8.2
Electro–discharge machines	0.5	1.0	0.2	0.1
Machining centers	0.3	0.7	4.1	4.7
Lathes	4.0	8.0	6.8	4.0
of which NC	2.1	5.3	3.2	2.1
Milling and boring machines	3.4	4.5	3.4	2.6
NC milling machines	0.9	1.0	0.6	0.2
NC boring machines	—	—	—	0.4
Drilling machines	0.4	1.2	0.6	0.4
of which NC	0.3	0.6	0.4	0.1
Sawing and cut–off machines	9.0	0.7	0.5	0.3
of which NC	—	0.2	—	—
Grinding machines	2.6	3.4	2.9	2.8
Presses (excl. stamping & forging)	0.8	1.6	1.2	0.7
Bending, folding or leveling	3.9	4.0	1.7	1.5
Punching and shearing machines	2.1	1.9	1.8	0.4
Other machine tools	10.8	17.7	6.7	6.6
Industrial robots	0.5	—	(a)	—

Source: Asociacion Argentina de Fabricantes de Maquinas–Herramienta, Accesorios Y Afines (AAFMHA)

Note: (a) – less than $50,000, (i) – incomplete, export and import figures for 1990 are the first 11 months only

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1986	$160.6	$198.1	$174.6	$184.2	107.6%	108.7%
1987	162.0	249.0	191.2	219.8	113.3	118.0
1988	174.5	344.7	236.0	283.1	121.7	135.3
1989	227.8	313.1	266.4	274.5	114.1	117.0
1990	283.7	372.9	391.2	265.3	140.6	137.9

AUSTRIA *Production*

(millions of U.S. dollars)

	1988	1989	1990
MACHINE TOOL TOTAL	$174.5	$227.8	$283.7
METAL CUTTING TOTAL	150.1	187.3	222.6
Lathes	50.4	74.1	93.4
Milling machines	30.7	32.2	37.7
Sawing machines	8.8	7.4	6.4
Other metal cutting	60.2	73.6	85.1
METAL FORMING TOTAL	24.4	40.5	61.1
Presses	5.7	9.2	8.4
Other metal forming	18.7	31.2	52.7
Parts – metal cutting	63.0	97.8	142.3
Parts – metal forming	10.3	11.3	15.0

Source: Association of Austrian Machinery and Steel Construction Industries

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BRAZIL

Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1986	$551.0	$65.1	$26.3	$589.8	11.0%	4.8%
1987	523.0	113.7	24.5	612.2	18.6	4.7
1988	536.0	163.8	40.4	659.4	24.8	7.5
1989	461.0	166.9	30.6	597.3	27.9	6.6
1990	301.0	na	37.4	na	na	12.4

Sources: Associacao Brasileira da Industria de Maquinas e Equipamentos (ABIMAQ); Sindicato Nacional da Industria de Maquinas (SINDIMAQ)

BRAZIL

Exports and Imports by Country

(millions of U.S. dollars)

	EXPORTS			IMPORTS		
	Cutting	Forming	Total	Cutting	Forming	Total
1978	$16.0	$ 4.2	$20.2	$160.2	$66.1	$226.2
1979	31.5	7.7	39.2	107.9	37.4	145.3
1980	57.3	14.3	71.5	151.5	23.8	175.3
1981	53.0	20.9	73.9	95.8	27.9	123.6
1982	17.7	3.2	20.9	65.1	20.1	85.3
1983	21.8	2.4	24.2	37.6	6.6	44.2
1984	18.5	1.8	20.2	35.3	4.7	39.9
1985	5.5	22.5	28.1	26.6	13.8	40.4
1986	11.8	14.5	26.3	46.6	18.6	65.1
1987	10.9	13.6	24.5	84.0	29.7	113.7
1988	19.3	20.8	40.0	121.6	42.2	163.8
1989	23.6	7.0	30.6	129.1	37.8	166.9
1990	34.8	2.6	37.4	na	na	na

Sources: Associacao Brasileira da Industria de Maquinas e Equipamentos (ABIMAQ); Sindicato Nacional da Industria de Maquinas (SINDIMAQ)

Note: na – not available

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Exports by Type of Machine

(thousands of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990p	1988	1989	1990p
MACHINE TOOL TOTAL	8,304	4,585	5,032	$66,255	$78,751	$101,949
METAL CUTTING TOTAL	6,790	2,473	2,625	22,395	38,111	32,437
Physico–chemical machines	65	1,134	752	1,506	1,400	2,007
Machining centers	12	10	32	1,043	649	1,921
Single station transfer	5	1	5	99	13	346
Multi–station transfer	4	34	14	898	19,057	10,443
Lathes	470	147	402	2,753	2,421	2,706
of which NC	7	8	11	556	1,168	813
Way type unit heads	na	na	—	470	145	—
Drilling machines	487	368	165	1,529	4,029	1,609
of which NC	5	6	8	700	675	628
Boring–milling machines	12	22	18	1,560	521	1,204
Other boring machines	28	14	65	859	373	775
Milling machines	463	32	30	3,527	2,136	1,855
of which NC	10	3	6	967	1,583	1,574
Threading or tapping	26	16	42	374	311	131
Grinding or finishing	1,019	323	564	2,446	4,068	3,556
Flat surface	673	7	60	573	344	378
Other precision	28	107	224	565	2,531	2,464
Sharpening machines	219	138	169	579	680	392
Honing or lapping	32	26	63	91	232	193
Grind. & finish n.e.c.	67	45	48	639	281	129
Planing machines	3	—	—	180	—	—
Shaping or slotting	33	5	74	377	219	243
Broaching machines	8	—	11	28	—	9
Gear cutting machines	22	9	10	572	1,084	154
Sawing or cut–off	523	146	427	2,606	1,334	5,035
Filing or engraving mach.	3,636	227	56	1,940	662	575
METAL FORMING TOTAL	1,514	2,112	2,407	43,860	40,639	69,512
Forging or die–stamping	79	62	196	3,714	1,456	5,313
Bending & forming	na	1,057	869	9,837	14,090	24,192
of which NC	na	109	107	4,500	7,585	8,068
Punching & shearing	243	67	307	5,225	2,180	5,716
NC shearing	15	5	5	1,413	204	176
Non–NC shearing	59	25	134	2,043	561	2,829
NC punch. or notch.	11	6	5	1,138	223	754
Non–NC punch. or notch.	158	31	163	631	1,192	1,957
Presses	585	517	736	12,735	12,728	21,862
of which hydraulic	72	29	252	2,902	3,100	6,712
Draw benches	86	106	34	1,784	2,201	2,149
Thread rolling machines	9	25	9	152	106	69
Machines for working wire	156	85	119	5,811	4,742	4,483
Metal forming n.e.c.	356	193	137	4,601	3,136	5,729

Source: Statistics Canada

Note: n.e.c. – not elsewhere classified, p – preliminary, na – not available

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(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990p	1988	1989	1990p
MACHINE TOOL TOTAL	100,262	125,494	99,658	$490.8	$449.7	$437.6
METAL CUTTING TOTAL	87,486	117,965	93,347	315.6	321.3	290.7
Physico–chemical machines	5,223	581	684	37.2	22.4	23.1
Laser, light or photon	453	88	96	7.0	4.5	7.0
Ultrasonic processes	65	29	44	1.0	0.4	1.0
EDM	508	203	133	26.8	13.4	9.4
Other	4,197	261	411	2.4	4.1	5.7
Machining centers	524	473	337	60.2	65.5	51.8
Single station transfer	46	2	4	0.2	0.5	0.2
Multi–station transfer	36	11	11	4.8	1.2	6.7
Lathes	3,236	3,684	3,107	68.0	78.2	65.8
NC horizontal	529	471	341	42.0	53.7	46.0
Non–NC horizontal	1,875	2,323	2,121	17.9	17.5	14.5
Other NC	29	60	10	3.2	3.4	3.4
Other non–NC	803	830	635	4.8	3.7	2.0
Way type unit heads	96	296	155	0.4	0.2	0.2
Drilling machines	30,286	25,522	23,050	13.1	16.5	13.0
of which NC	28	31	20	3.3	3.5	4.0
Boring & boring–milling	526	324	229	19.2	23.0	20.0
NC boring–milling	66	25	24	4.5	8.3	7.0
Non–NC boring–milling	142	31	34	3.5	1.7	1.7
Other boring	318	268	171	11.3	12.9	11.3
Milling machines	1,616	1,827	994	31.9	26.7	20.1
NC knee–type	42	60	54	4.6	5.9	6.3
Non–NC knee type	1,150	1,565	799	12.9	11.6	7.3
Other NC	95	65	50	7.9	7.3	5.4
Other non–NC	329	137	91	6.6	1.8	1.0
Threading or tapping	670	874	860	4.5	2.8	2.9
Grinding or finishing	25,844	64,431	54,092	52.8	54.7	57.6
NC flat surface	18	12	15	4.1	2.0	2.8
Non–NC flat surface	706	699	437	8.2	6.8	5.0
Other NC precision	92	50	84	10.8	14.4	25.8
Other non–NC precision	14,696	14,213	6,030	13.3	12.4	7.3
NC sharpening	19	26	6	1.1	3.4	0.3
Non–NC sharpening	1,112	23,183	43,562	5.3	5.8	5.4
Honing or lapping	3,677	435	74	2.7	1.4	3.6
Grind. & finish. n.e.c.	5,524	25,813	3,884	7.3	8.6	7.4
Planing machines	4	3	10	0.1	0.2	0.9
Shaping or slotting	112	23	47	1.7	0.8	0.8
Broaching machines	92	58	34	1.1	2.2	1.5
Gear cutting machines	103	70	51	2.7	5.7	6.6
Sawing or cut–off	17,667	17,943	9,163	17.7	17.4	17.2
Filing or engraving	2,075	1,843	519	4.4	3.7	2.4
METAL FORMING TOTAL	12,776	7,529	6,311	175.2	128.4	146.9
Forging and die–stamping	373	221	199	26.5	12.6	14.0
Bend., fold., str., etc.	3,117	4,573	4,011	29.6	28.8	37.5
of which NC	514	246	261	13.1	13.6	23.5
Punching & shearing	1,560	1,125	811	32.9	36.4	27.9
NC shearing machines	167	86	54	3.8	4.3	4.1
Non–NC shearing	429	373	247	5.2	5.4	3.9
NC punch. or notch.	173	132	118	15.4	18.5	14.7
Non–NC punch. or notch.	791	534	392	8.5	8.3	5.3
Presses	3,410	541	533	66.6	28.3	50.4
of which Hydraulic	2,903	296	179	41.8	17.9	10.3
Draw benches	99	46	47	2.2	2.6	4.9
Thread rolling machines	92	29	33	1.8	0.6	0.8
Wire working machines	674	410	294	8.7	11.5	6.7
Metal forming n.e.c.	3,451	584	383	6.9	7.4	4.6

Source: Statistics Canada

Note: n.e.c. = not elsewhere classified

CHINA

Production

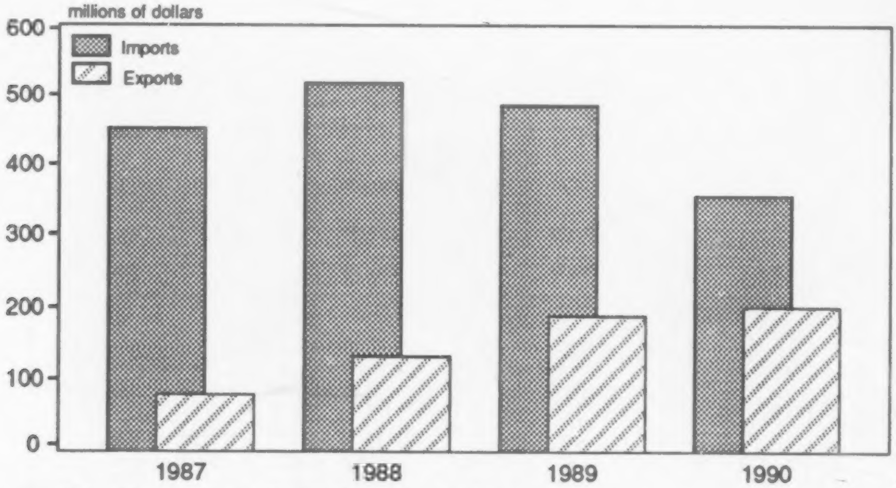
(units)

	1988	1989	1990
MACHINE TOOL TOTAL	200,800	246,200	180,772
METAL CUTTING TOTAL	191,700	178,700	134,481
NC machine tools	2,681	2,742	2,634
Lathes	86,691	80,963	61,372
Drilling machines	23,429	20,984	16,948
Boring machines	4,962	5,445	4,823
Grinding machines	16,079	18,007	13,008
Milling machines	15,085	15,183	12,555
Planing machines	9,363	7,386	4,537
METAL FORMING TOTAL	9,100	67,500	46,291

Source: China Machine Tool & Tool Builders' Association

CHINA

Imports and Exports



Source: China Machine Tool & Tool Builders' Association

DENMARK *Industry Overview*

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1987	$59.0	$106.7	$63.2	$102.5	104.1%	107.1%
1988	63.0	108.9	80.0	92.0	118.5	127.0
1989	63.2	104.8	77.4	90.6	115.6	122.4
1990	80.5	146.0	95.4	131.1	111.4	118.5

Source: The Association of Danish Machine Tool Manufacturers

DENMARK *Production*

(millions of U.S. dollars)

	UNITS		VALUE	
	1989	1990	1989	1990
MACHINE TOOL TOTAL	na	na	$63.2	$80.5
METAL CUTTING TOTAL	20,853	17,741	29.7	37.2
Physico–chemical machines	1	–	(a)	–
Machining centers	1	1	0.1	(a)
Lathes	292	545	0.3	0.7
Way type unit heads	105	184	2.6	5.9
Drilling machines	25	23	1.1	1.1
of which NC	22	20	1.1	1.1
Boring–milling machines	81	80	3.4	3.7
of which NC	22	9	1.9	1.0
Boring machines	127	61	1.7	1.7
Grinding & polishing	18,783	15,674	17.0	20.4
Sawing & cut–off machines	1,438	1,144	3.6	3.7
METAL FORMING TOTAL	na	na	33.5	43.3
Sheet metal working machines	208	3,312	16.6	25.5
Shearing machines	449	148	5.3	5.0
Punching or notching machines	na	na	4.9	4.4
Presses	15	na	6.7	8.5
Thread rolling machines	14	–	0.1	–

Source: The Association of Danish Machine Tool Manufacturers

Note: na – not available, (a) – less than $50,000

DENMARK

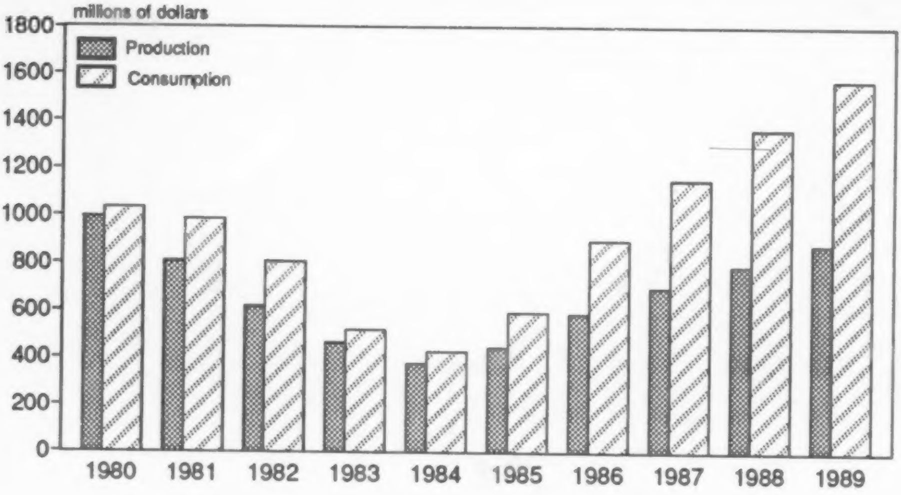
Exports and Imports by Type of Machine

(millions of U.S. dollars)

	EXPORTS				IMPORTS			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	$63.2	$80.0	$77.4	$95.4	$106.7	$108.9	$104.8	$146.0
METAL CUTTING TOTAL	32.8	47.2	41.8	49.3	77.5	75.2	77.2	109.1
Physico–chemical	2.8	2.1	2.1	1.9	6.4	10.5	8.6	11.3
Gear cutting machines	0.2	(a)	–	0.1	0.2	0.3	0.4	1.6
of which NC	–	–	–	–	0.1	(a)	(a)	1.3
Jig boring	0.4	(b)	(b)	(b)	9.1	(b)	(b)	(b)
of which NC	0.4	(b)	(b)	(b)	9.1	(b)	(b)	(b)
Threading & tapping	0.4	0.9	0.3	0.4	2.3	1.7	1.2	1.1
Drilling machines	2.6	1.8	1.8	1.7	3.7	2.7	2.0	3.3
of which NC	0.3	0.8	1.2	0.8	0.9	1.5	0.5	1.2
Milling machines	2.3	4.1	1.0	3.1	10.5	5.9	5.7	4.9
of which NC	0.7	0.7	0.4	2.0	6.9	2.3	2.4	1.5
Machining centers	(b)	1.2	0.7	0.5	(b)	10.0	11.3	17.7
Transfer machines	(b)	(c)	0.5	0.5	(b)	(c)	0.5	1.0
Way type unit heads	(b)	(b)	0.6	0.3	(b)	(b)	0.3	4.2
Planing machines	(a)	(b)	(a)	0.1	0.2	(b)	0.2	0.4
Shape, slot, cut–off	3.0	4.3	3.8	5.1	5.1	5.9	4.9	5.9
Lathes	1.7	2.4	3.5	2.2	20.2	18.3	21.8	33.4
of which NC	1.2	1.4	0.8	0.6	15.2	11.4	15.7	27.1
Boring, bore–mill	2.2	7.3	5.9	8.5	7.1	7.3	10.0	10.1
of which NC	0.4	2.1	1.8	1.1	6.4	4.4	6.7	8.4
Grinding & polishing	18.6	22.3	21.1	24.6	11.6	11.2	9.7	12.5
of which NC	2.0	2.3	1.9	2.5	5.1	2.9	3.4	5.4
Metal cutting n.e.c.	(a)	0.8	0.5	0.3	0.9	1.4	0.5	1.8
METAL FORMING TOTAL	30.4	32.8	35.5	46.2	29.2	33.7	27.6	36.9
Presses	9.2	9.4	8.1	6.0	4.7	6.2	6.0	6.7
of which NC	3.2	1.9	na	1.1	2.5	0.7	na	3.9
Sheet metal working	11.4	13.8	16.8	24.7	7.1	8.6	6.2	10.0
of which NC	6.1	8.6	11.5	18.6	3.8	3.2	2.0	4.2
Shearing machines	7.7	8.5	6.7	9.9	11.0	14.1	6.1	6.0
of which NC	2.7	3.0	2.9	1.4	6.1	7.2	2.3	1.4
Forging, hammers	(a)	0.3	0.1	0.4	0.1	0.2	0.6	0.7
Punching or notching	(d)	(d)	3.3	3.4	(d)	(d)	4.5	9.3
of which NC	(d)	(d)	0.5	0.6	(d)	(d)	3.1	5.8
Drawing machines	0.2	(a)	0.1	0.2	0.1	0.3	0.2	0.4
Thread rolling mach.	(a)	(a)	0.1	0.1	0.1	0.2	0.1	(a)
Wire working machines	0.2	0.1	0.1	0.1	1.6	1.0	1.2	1.3
Metal forming n.e.c.	1.7	0.7	0.3	1.5	4.6	3.0	2.6	2.6

Source: The Association of Danish Machine Tool Manufacturers

Note: n.e.c. – not elsewhere classified, (a) – less than $50,000, (b) – included in "metal cutting n.e.c.," (c) – included in "machining centers," (d) – included in "metal forming n.e.c."



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1980	$995.3	$554.1	$515.9	$1,033.5	53.6%	51.8%	19,650
1981	809.4	566.6	390.5	985.5	57.5	48.2	19,000
1982	622.2	479.3	295.0	806.5	59.4	47.4	17,660
1983	464.5	351.1	295.2	520.4	67.5	63.6	15,500
1984	376.7	301.2	250.1	427.8	70.4	66.4	13,400
1985	444.7	357.5	208.6	593.6	60.2	46.9	12,050
1986	588.1	618.0	308.1	898.0	68.8	52.4	11,450
1987	697.3	738.1	284.3	1,151.1	64.1	40.8	10,025
1988	790.6	971.1	396.1	1,365.6	71.1	50.1	9,190
1989	879.4	1,110.5	415.9	1,574.0	70.6	47.3	9,475
1990	na	1,627.8	538.6	na	na	na	na

Source: Syndicat de la Machine Outil, de l'Assemblage et de la Productique associee (SYMAP)

Note: na – not available

(millions of U.S. dollars)

	UNITS			VALUE		
	1987	1988	1989	1987	1988	1989
MACHINE TOOL TOTAL	33,112	34,187	na	$697.3	$872.9	$879.4
of which NC	2,913	3,657	na	438.2	532.3	583.7
METAL CUTTING TOTAL	27,416	27,821	na	556.1	602.7	662.8
of which NC	2,259	2,641	na	394.3	468.9	490.6
Physico–chemical mach.	249	125	(b)	11.0	5.7	(b)
of which NC	19	7	(b)	5.6	1.6	(b)
Machining centers	265	256	291	46.7	52.4	72.7
Horizontal	176	112	166	26.5	31.7	51.7
Vertical	89	144	125	20.2	20.7	21.0
Transfer machines	455	475	544	112.1	134.9	142.6
of which NC	66	60	115	99.0	118.9	125.5
Lathes, turning centers	920	832	1,226	94.0	102.8	134.7
of which NC	593	617	929	83.8	94.3	121.1
Drilling machines	2,347	2,318	2,757	4.9	5.1	7.9
Milling machines	822	566	680	62.6	82.7	113.3
of which NC	297	399	490	47.4	74.2	102.7
Sawing & cut–off	1,754	1,852	2,427	10.1	10.7	14.0
Grinding, polishing	9,859	10,061	3,680	25.0	15.4	23.7
of which NC	127	7	na	5.3	1.1	na
Metal cutting n.e.c.	10,745	11,646	na	189.7	195.2	154.0
METAL FORMING TOTAL	5,696	6,366	na	141.2	187.9	216.5
of which NC	654	1,016	na	43.9	63.4	93.2
Presses	953	989	1,926	21.9	23.1	64.7
Bending & forming	1,240	958	443	18.4	41.6	6.6
of which NC	177	495	na	8.7	27.3	na
Punching & shearing	1,584	2,268	2,500	22.0	32.8	56.3
of which NC	12	242	247	0.6	3.0	7.5
Wire working machines	164	138	74	11.8	8.7	8.8
Metal forming n.e.c.	1,755	2,013	na	67.2	81.7	80.0

Source: Syndicat de la Machine Outil, de l'Assemblage et de la Productique associee (SYMAP)

Note: na – not available, n.e.c. = not elsewhere classified, (b) – included in "metal cutting n.e.c."

Some confidential data withheld from individual product categories have been included in the "metal cutting n.e.c." and "metal forming n.e.c." categories. NC portion of "METAL CUTTING TOTAL" and "METAL FORMING TOTAL" include all NC machines, including withheld data.

BRAZIL

Production

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	28,701	29,871	34,454	28,479	11,723	$551	$523	$536	$461	$301
METAL CUTTING TOTAL	23,908	25,920	30,717	19,961	10,337	450	449	414	389	266
Lathes	8,537	8,314	6,529	7,076	5,998	164	197	182	161	130
Milling machines	1,730	1,969	1,216	4,722	409	4	48	47	43	27
Drilling machines	2,477	7,332	4,966	2,570	1,794	19	19	20	19	10
Boring & milling machines	169	227	122	118	34	30	50	18	12	17
Planing machines	342	179	309	36	3	6	3	2	1	0
Sawing machines	5,022	3,568	9,107	4,190	945	7	7	6	16	6
Grinding machines	983	810	778	588	365	78	54	53	49	26
Sharpeners	249	159	300	385	312	6	4	10	23	5
Machining centers	191	120	70	87	36	42	39	37	61	24
Polish, rough grind, surface	3,700	2,702	6,038	149	4	24	20	5	(a)	(a)
Metal cutting n.e.c.	404	355	191	40	447	3	8	34	4	21
METAL FORMING TOTAL	4,793	3,951	3,737	8,518	1,386	101	74	122	72	35
Sheet metal working	821	1,004	1,260	891	830	18	22	27	31	8
Presses	1,448	1,321	765	6,853	459	41	24	50	25	17
Metal forming n.e.c.	2,524	1,626	1,712	774	97	42	28	45	16	26

Sources: Associacao Brasileira da Industria de Maquinas e Equipamentos (ABIMAQ); Sindicato Nacional da Industria de Maquinas (SINDIMAQ)

Note: (a) – less than $50,000, n.e.c. – not elsewhere classified

CHINA

Exports by Type of Machine

(thousands of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	183,868	433,218	602,975	611,897	$79,109	$131,847	$188,308	$200,592
METAL CUTTING TOTAL	172,594	411,595	585,357	599,951	66,756	112,697	160,334	180,043
EDM & ultrasonic machines	31	93	90	151	1,007	2,023	1,711	2,205
CNC gear cutting machines	46	25	12	na	326	249	273	na
Gear cutting machines	110	133	437	719	1,131	1,818	2,467	5,301
CNC lathes	948	486	294	na	4,085	4,027	4,975	na
Lathes	4,454	6,841	11,705	19,629	22,924	32,350	59,545	84,634
CNC milling	55	100	196	na	346	849	1,333	na
Milling machines	1,564	3,165	5,129	6,742	10,434	18,911	26,417	34,617
Bench drills	14,549	77,983	129,021	142,591	1,238	4,379	6,977	7,929
CNC drilling machines	173	46	48	na	185	62	221	na
Drilling machines	1,042	3,128	3,653	5,339	4,354	9,053	11,962	15,489
CNC boring machines	3	14	10	na	288	745	161	na
Boring machines	272	801	1,196	na	1,274	7,805	8,280	na
Circular sawing machines	424	303	591	na	48	47	77	na
Band or hack sawing machines	223	503	1,136	na	175	301	479	na
Sawing machines	132	290	587	4,440	34	209	275	1,201
CNC planing machines	11	1	81	na	73	34	261	na
Planing machines	688	1,522	1,307	1,781	2,043	4,694	4,168	4,596
Threading & tapping machines	408	604	615	716	123	196	350	650
CNC grinding machines	2	2	11	na	12	10	2,293	na
Grinding machines	942	1,111	1,357	1,566	13,346	18,604	19,378	15,251
Grinding wheel machines	140,791	290,203	403,434	414,153	2,604	5,145	7,629	8,402
Polishers	5,728	24,241	23,847	na	735	1,186	1,103	na
METAL FORMING TOTAL	7,473	15,901	12,042	14,070	8,715	11,769	20,907	20,817
CNC presses	60	1	109	na	125	6	97	na
Presses	1,110	393	861	706	1,073	928	1,633	1,735
Bending & straightening machines	197	343	334	405	271	314	1,111	2,386
Shearing machines	288	569	1,089	3,382	1,558	1,097	3,147	6,119
Punching machines	1,251	6,731	2,709	na	841	2,445	2,548	na
Metal forming n.e.c.	4,567	7,864	6,940	9,577	4,847	6,979	12,372	10,077
Slot, broach, thread rolling	3,799	5,722	6,176	na	3,613	7,381	7,067	na
Fixtures and jigs	–	–	–	–	8,305	8,364	12,718	15,458
Accessories	–	–	–	–	5,642	12,111	9,784	13,147

Source: China Machine Tool and Tool Builders' Association (CMTBA)

Note: na – not available, n.e.c. – not elsewhere classified. Individual items may not add up to totals.

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CHINA

Imports by Type of Machine

(thousands of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	25,817	44,489	41,730	30,368	$453,579	$519,010	$486,270	$358,163
METAL CUTTING TOTAL	12,870	22,107	20,102	22,640	244,546	227,429	243,050	261,688
EDM & ultrasonic machines	134	190	173	316	26,068	28,097	12,009	12,728
CNC gear cutting machines	33	13	120	na	6,204	7,598	4,907	na
Gear cutting machines	115	72	182	93	11,105	5,470	7,189	10,756
CNC lathes	155	148	125	na	28,856	19,803	20,993	na
Lathes	2,140	3,607	3,785	5,919	15,716	18,512	24,641	47,772
CNC milling	74	66	100	na	23,140	16,524	22,181	na
Milling machines	764	1,094	1,511	1,605	15,808	15,884	23,973	47,274
Bench drills	67	118	129	442	19	85	55	77
CNC drilling machines	31	23	18	na	4,839	2,749	4,601	na
Drilling machines	3,758	4,208	3,937	4,632	4,013	5,200	5,329	30,035
CNC boring machines	20	9	19	na	5,790	6,880	10,564	na
Boring machines	78	59	83	na	16,196	11,871	12,118	na
Circular sawing machines	15	42	18	na	88	34	162	na
Band or hack sawing machines	48	27	66	na	764	291	921	na
Sawing machines	339	1,541	605	671	2,170	2,655	3,120	3,346
CNC planing machines	na	3	4	na		1,199	451	na
Planing machines	251	461	459	502	673	1,237	1,382	1,639
Threading & tapping machines	314	247	391	360	2,397	2,307	2,965	2,195
CNC grinding machines	92	56	72	na	18,454	18,902	22,753	na
Grinding machines	1,098	1,544	3,048	2,371	50,514	44,911	49,171	97,966
Grinding wheel machines	810	2,030	1,086	1,570	637	406	591	622
Polishers	2,536	6,549	4,171	na	11,098	16,074	12,976	na
METAL FORMING TOTAL	9,402	13,000	12,130	11,887	150,161	155,474	138,146	130,493
CNC presses	37	25	21	na	7,113	21,272	8,234	na
Presses	307	308	286	334	20,021	14,356	14,558	28,412
Bending & straightening machines	492	534	603	689	20,497	22,508	27,401	12,961
Shearing machines	534	473	423	5,725	8,193	7,411	7,300	35,646
Punching machines	3,450	5,038	4,244	na	18,295	28,808	21,474	na
Metal forming n.e.c.	4,580	6,622	6,553	5,139	76,042	61,119	59,179	26,734
Slot, broach, thrd. rolling	3,545	9,382	9,498	na	58,872	136,845	105,075	na

Source: China Machine Tool and Tool Builders' Association (CMTBA)
Note: na – not available, n.e.c. – not elsewhere classified. Individual items may not add up to totals.

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Imports and Exports by Type of Machine

(millions of U.S. dollars)

	IMPORTS			EXPORTS		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	$971.1	$1,110.5	$1,627.8	$396.1	$415.9	$538.6
METAL CUTTING TOTAL	758.9	850.1	1,187.1	254.1	258.2	312.6
Physico–chemical machines	75.9	86.3	119.2	31.9	25.6	28.1
Laser & photon machines	10.9	18.5	29.6	10.0	5.1	7.0
of which NC	5.8	12.4	21.3	2.3	0.5	2.4
Ultrasonic machines	3.0	3.8	2.1	1.1	3.0	1.6
of which NC	0.7	—	0.4	0.1	0.3	0.3
Spark–erosion machines	51.4	54.6	72.3	4.2	2.3	2.1
of which NC	40.8	46.3	62.7	1.4	1.8	1.7
Other	10.6	9.4	15.2	16.6	15.1	17.4
of which NC	2.1	2.0	3.7	4.2	2.7	3.4
Machining centers	114.0	145.6	213.3	37.6	44.1	40.4
Transfer machines	62.0	49.1	63.5	9.7	6.3	19.0
NC single station	8.8	8.6	13.1	2.7	1.8	1.9
Non–NC single station	5.3	4.3	5.9	0.8	1.5	1.5
NC multi–station	35.6	22.6	28.2	1.8	1.3	1.8
Non–NC multi–station	12.2	13.7	16.3	4.4	1.7	13.8
Lathes	192.9	240.9	354.3	68.7	56.3	88.9
NC horizontal lathes	112.6	143.5	180.6	36.4	38.4	44.0
Parallel	34.1	41.7	57.2	3.6	5.4	10.6
Multiple spindle	31.9	43.3	51.3	4.2	4.9	2.1
Copying	2.0	6.0	6.9	0.6	0.9	1.0
Automatic and turret	40.1	47.6	59.0	25.4	25.2	29.6
Other	4.5	4.8	6.2	2.6	1.9	0.8
Non–NC horizontal lathes	31.9	39.1	59.4	8.7	8.6	14.0
Parallel	7.3	8.8	15.4	3.6	2.2	4.5
Multiple spindle	6.0	4.2	8.9	0.5	0.4	1.3
Copying	0.8	1.3	1.1	0.4	0.1	0.2
Automatic and turret	15.2	18.9	25.0	1.8	2.3	3.1
Other	2.6	6.0	9.0	2.3	3.6	5.0
NC vertical lathes	6.9	8.2	33.0	8.5	2.2	7.4
NC lathes n.e.c.	4.0	3.6	9.3	0.8	1.9	4.6
Non–NC vertical lathes	2.0	2.1	3.2	1.1	1.9	0.8
Non–NC lathes n.e.c.	3.8	5.4	9.4	4.4	3.4	4.1
Way type unit heads	11.3	10.3	21.5	5.8	4.1	1.9
Drilling machines	24.6	26.6	34.5	6.1	7.8	9.4
NC	10.8	9.4	15.2	1.5	2.9	3.9
Radial	3.5	3.8	1.9	0.6	1.2	1.3
Multi–spindle	3.1	1.7	6.7	(a)	0.5	0.4
Other	4.2	3.9	6.6	0.9	1.2	2.2
Non–NC	13.8	17.2	19.3	4.6	4.9	5.5
Radial	1.5	2.4	4.1	0.1	0.3	0.3
Multiple–spindle	2.0	3.5	3.3	0.1	0.1	0.2
Other	10.3	11.3	11.9	4.4	4.5	5.0
Boring–milling machines	34.4	31.0	42.6	3.4	3.0	1.2
of which NC	30.0	23.8	32.9	1.1	2.3	0.5
Boring machines	3.4	3.6	3.5	3.1	1.8	1.3
of which NC	0.6	1.8	(a)	0.2	0.1	0.1
Milling machines	66.3	68.5	97.6	44.8	52.2	56.1
NC knee type	8.5	7.1	9.7	1.5	0.6	1.2
Non–NC knee type	5.7	5.6	14.1	4.3	5.8	4.7
NC tool milling	9.9	14.5	19.2	11.6	16.4	26.9
NC plano–milling	2.3	0.2	0.6	0.2	0.7	0.1
Other NC milling	24.2	27.6	33.0	22.1	24.4	17.9
Non–NC tool milling	2.2	2.0	3.1	0.6	0.6	0.5
Non–NC plano–milling	2.1	0.7	0.5	0.3	0.4	0.3
Other non–NC milling	11.3	10.7	17.4	4.1	3.5	4.6
Threading and tapping	5.7	9.7	10.9	2.1	2.3	2.0
Planing machines	0.3	0.1	0.8	1.6	0.6	0.6
Shaping or slotting	0.7	0.7	1.2	0.9	0.5	0.5
Broaching machines	8.4	7.0	15.3	1.8	0.5	1.1

(continued)

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Imports and Exports by Type of Machine
(continued)

(millions of U.S. dollars)

	IMPORTS			EXPORTS		
	1988	1989	1990	1988	1989	1990
Grinding machines	$131.6	$139.9	$180.2	$31.7	$32.7	$44.2
NC surface	12.9	12.7	14.8	0.5	1.0	2.2
Non–NC surface	10.2	17.4	20.4	3.0	1.9	2.2
NC cylindrical	21.3	24.3	40.4	1.2	1.3	3.3
Non–NC cylindrical	15.9	18.4	19.1	2.7	0.9	3.4
Other NC precision	21.6	17.5	27.1	1.7	2.3	2.6
Other non–NC precision	15.5	16.7	17.8	5.9	8.6	11.6
NC tool or cutter	3.6	2.9	6.6	1.5	1.9	2.4
Non–NC tool or cutter	10.1	10.4	10.6	4.2	3.8	3.6
Honing or lapping	3.9	5.3	5.2	1.8	1.3	1.1
Other grinding n.e.c.	16.6	14.2	18.2	9.1	9.6	11.8
Gear cutting machines	23.7	29.0	34.0	1.4	2.0	2.5
NC gear hobbing	10.8	10.4	16.7	(a)	(a)	0.1
Non–NC gear hobbing	4.3	3.1	5.4	0.2	0.3	0.6
NC gear cutting n.e.c.	1.0	3.9	2.7	(a)	0.3	0.2
Non–NC gear cut. n.e.c.	2.5	5.8	5.7	1.2	1.1	1.0
NC gear finishing	3.9	—	—	(a)	—	—
Non–NC gear finishing	0.5	4.7	2.3	(a)	0.1	0.5
Other gear finishing	0.7	1.1	1.2	(a)	0.1	0.1
Sawing & cut–off	29.7	33.0	47.1	9.3	14.6	19.7
Circular sawing	10.9	10.6	16.5	3.0	6.3	7.1
Non–circular sawing	10.1	13.6	19.5	4.0	4.4	8.3
Cut–off machines	8.7	8.8	11.1	2.3	3.9	4.3
Metal cutting n.e.c.	5.9	7.7	6.8	3.1	4.0	9.5
METAL FORMING TOTAL	212.2	260.4	440.7	142.1	157.7	226.0
Forging or die–stamping	16.6	12.7	42.6	24.7	12.2	7.2
of which NC	5.6	3.0	7.1	0.9	1.1	0.3
Bend., fold, strght., etc.	45.2	54.9	76.4	23.9	[illegible]	75.2
NC for flat products	7.4	13.8	14.5	2.2	[illegible]	28.0
Other NC	6.5	7.3	11.2	2.9	[illegible]	8.3
Non–NC for flat products	15.1	14.1	24.2	5.9	[illegible]	13.6
Non–NC hydr., excl. flat prod.	5.8	7.4	8.2	9.4	6.8	10.5
Other non–NC	10.4	12.3	18.3	3.6	5.7	14.8
Punching & shearing	75.9	89.0	132.4	36.4	54.1	84.3
NC shear. for flat prod.	3.2	[illegible]	12.1	2.7	5.2	16.1
Other NC shearing	2.4	2.6	5.3	1.1	1.6	2.2
Non–NC shear., flat prod.	5.5	7.8	12.3	8.2	9.0	8.9
Non–NC hydr. shearing	3.1	7.5	13.4	4.6	6.3	9.4
Other non–NC shearing	5.1	3.5	8.6	2.4	3.5	5.2
NC p. or notch., flat prod.*	32.2	39.1	48.2	8.8	18.8	32.2
Other NC p. or notch.*	10.0	5.5	7.2	3.7	1.4	3.7
Non–NC p. or n., flat prod.*	7.4	7.0	12.6	2.3	5.2	3.2
Other non–NC p. or notch.*	7.0	9.9	12.7	2.6	3.1	3.4
Presses	40.1	50.4	97.8	34.9	28.1	31.8
Hydr. die casting	2.3	2.6	5.4	1.5	0.6	1.3
NC hydraulic presses	8.3	7.2	9.6	16.1	10.5	7.7
Hydr. press for bolts, rivets	0.7	0.8	1.6	(a)	(a)	(a)
Non–NC hydr. presses	8.4	11.2	12.0	3.1	5.4	4.8
Other die casting	0.3	2.9	3.4	0.4	1.2	2.8
Other NC presses	0.8	0.6	3.4	0.5	1.5	0.4
Other press for bolts, rivets	4.5	4.0	9.8	0.2	(a)	0.9
Other non–NC presses	14.9	21.2	52.7	13.3	8.8	13.8
Draw benches	5.7	7.9	10.7	3.0	7.6	6.8
Thread rolling machines	2.9	2.0	3.5	0.8	0.6	1.1
Machines for working wire	9.4	12.3	13.9	7.8	5.3	7.8
Metal forming n.e.c.	16.5	31.2	63.1	10.7	12.6	11.9

Source: Syndicat de la Machine Outil, de l'Assemblage et de la Productique associee (SYMAP)

Note: (a) – less than $50,000, * includes combined punching and shearing machines, n.e.c. = not elsewhere classified. Items may not add up to totals due to rounding.

FRANCE

Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$618.0	$738.1	$971.1	$1,110.5	$1,627.8
West Germany	182.7	225.6	295.3	336.9	530.2
Italy	119.8	152.8	166.7	192.2	286.8
Switzerland	91.2	108.2	125.4	141.4	198.7
Japan	77.5	84.6	127.2	143.9	179.9
United Kingdom	26.4	35.3	62.2	64.6	88.0
United States	30.3	24.8	30.9	40.4	83.2
Spain	17.6	22.4	33.1	46.9	74.8
Taiwan	7.4	14.1	21.0	26.4	37.6
Belgium–Luxembourg	22.0	17.5	28.8	26.9	35.5
Austria	4.9	8.9	11.7	15.1	22.1
Sweden	6.5	5.3	6.1	13.5	15.1
Netherlands	4.7	3.8	7.2	8.4	11.5
USSR	1.4	2.9	3.4	4.1	5.5
East Germany	7.3	6.6	6.7	10.3	(c)
All other countries	18.3	25.3	45.4	39.5	59.1

Source: Syndicat de la Machine Outil, de l'Assemblage et de la Productique associee (SYMAP)

Note: (c) – included in "West Germany"

FRANCE

Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$308.1	$284.3	$396.1	$415.9	$538.6
West Germany	39.2	50.7	43.9	71.3	118.0
Italy	19.0	21.2	34.3	39.4	57.7
United States	41.0	15.0	20.9	37.0	38.7
United Kingdom	16.6	17.4	38.6	31.4	38.0
Belgium–Luxembourg	13.2	12.3	18.3	[illegible]9	35.1
Switzerland	18.0	18.8	26.5	23.4	33.0
Spain	6.4	12.4	14.1	20.6	28.0
Algeria	24.6	13.6	12.2	11.2	20.4
USSR	5.5	24.0	20.6	6.8	17.5
Netherlands	5.3	5.4	8.1	5.1	10.5
Sweden	3.9	4.8	6.0	5.2	10.3
Morocco	3.3	2.7	5.1	5.1	9.1
Yugoslavia	0.6	0.7	3.5	(b)	9.0
China	5.8	4.5	3.6	(b)	8.3
Turkey	3.8	0.5	3.3	(b)	7.0
East Germany	21.6	5.8	39.1	39.1	(c)
Canada	6.6	4.5	3.5	(b)	(b)
Portugal	2.0	3.1	2.6	7.2	(b)
All other countries	71.7	66.9	91.9	92.2	98.0

Source: Syndicat de la Machine Outil, de l'Assemblage et de la Productique associee (SYMAP)

Note: (b) – included in "All other countries," (c) – included in "West Germany"

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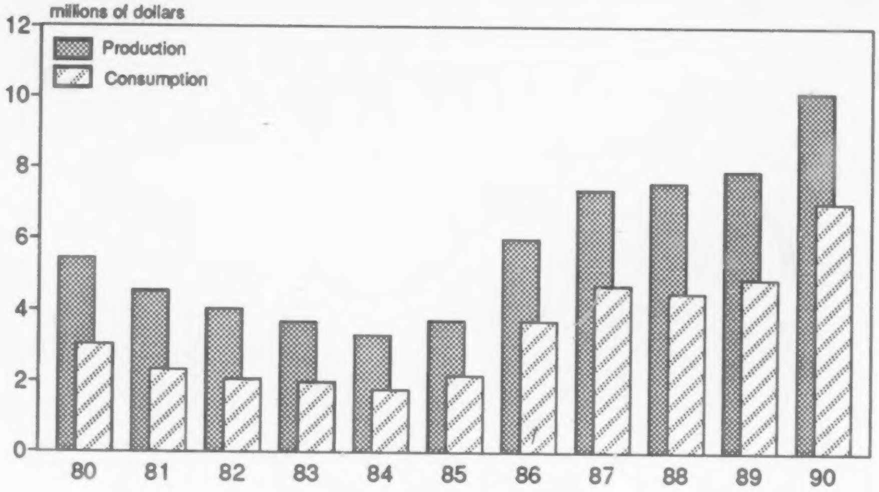

(millions of U.S. dollars)

	Production	Exports	Imports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1975	$2,751.7	$2,078.2	$271.5	$945.0	28.7%	75.5%	109,300
1976	2,766.5	1,991.3	296.7	1,072.3	27.7	72.0	101,400
1977	3,051.0	2,129.0	397.5	1,319.4	30.1	69.8	95,900
1978	3,823.1	2,484.8	570.0	1,908.3	29.9	65.0	94,800
1979	4,690.9	2,904.7	756.7	2,543.0	29.8	61.9	95,000
1980	5,439.8	3,391.6	994.1	3,042.3	32.7	62.3	98,000
1981	4,545.1	2,982.7	774.8	2,337.2	33.2	65.6	97,000
1982	4,034.0	2,588.0	623.1	2,069.2	30.1	64.2	93,000
1983	3,681.9	2,282.9	586.3	1,985.3	29.5	62.0	83,700
1984	3,313.9	2,125.2	598.8	1,787.5	33.5	64.1	83,000
1985	3,712.3	2,315.6	[illegible]	2,181.7	36.0	62.4	88,000
1986	5,993.1	3,633.9	1,337.3	3,696.5	36.2	60.6	93,000
1987	7,384.0	4,251.7	1,571.7	4,704.0	33.4	57.6	93,500
1988	7,585.1	4,692.5	1,606.9	4,499.5	35.7	61.9	94,000
1989	7,929.8	4,881.4	1,848.4	4,896.8	37.7	61.6	97,500
1990	10,165.9	5,847.0	2,721.4	7,040.3	38.7	57.5	102,000

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: ¹ figures include parts

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
NC MACHINE TOOL TOTAL	19,364	21,550	22,131	$3,396.8	$3,565.8	$4,974.6
NC METAL CUTTING TOTAL	18,597	20,563	20,327	2,989.0	3,125.5	4,356.4
Physico–chemical	414	317	474	79.0	64.6	104.9
Machining centers	1,372	2,198	2,361	500.0	621.1	919.9
Transfer machines	129	101	143	260.2	171.3	334.4
Lathes	2,782	3,396	3,337	689.7	750.6	826.2
Centerless	930	1,085	1,207	183.4	210.8	259.5
Multi–spindle automatic	271	249	18	144.6	121.8	8.4
Single spindle automatic	1,031	1,243	1,098	247.9	261.2	251.1
Capstan & turret	484	696	811	92.8	120.1	168.5
Vert. boring & turn. mills	na	na	124	na	na	103.8
Other lathes	66	123	79	21.0	36.7	34.9
Multi–spindle drilling machines	21	31	na	7.6	15.8	na
Boring machines	na	48	62	na	17.2	13.8
Milling machines	4,755	4,559	4,965	637.3	664.0	775.0
Copying milling	646	372	483	32.1	34.8	45.4
Knee–type	113	108	116	8.8	9.0	14.4
Plano–milling	126	158	169	83.9	93.5	104.4
Tool milling	3,659	3,732	4,088	392.8	396.9	550.6
Horiz. boring–milling	77	77	10	86.1	87.4	11.5
Other milling	134	112	99	33.6	42.4	48.7
Circular saws	1,171	1,243	1,441	53.4	52.9	72.0
Band saws	365	530	697	16.9	22.6	34.6
Rotary index table & drum machines	899	48	51	41.8	24.8	43.9
Gear cutting machines	597	627	670	146.0	173.1	254.0
Gear milling	200	223	292	70.8	78.4	114.7
Gear grinding	163	211	87	37.9	54.4	70.1
Other gear cutting	234	193	291	37.3	40.3	69.2
Grinding machines	2,717	3,879	4,130	376.5	418.5	654.1
Tool & cutter	1,020	2,214	1,839	102.0	133.1	136.3
Surface	717	686	784	97.3	95.1	110.3
Plain external cylindrical	163	205	228	66.2	77.8	97.5
Honing & lapping	na	na	235	na	na	84.7
Centerless ext. cylindrical	na	na	48	na	na	15.4
Special purpose	83	80	146	57.7	57.1	131.0
Grinding machines n.e.c.	734	694	850	53.3	55.4	78.9
Metal cutting n.e.c.	3,375	3,586	1,996	180.5	129.1	323.5
NC METAL FORMING TOTAL	767	987	1,804	407.9	440.2	618.3
Hammers	na	na	221	na	na	22.6
Presses	68	98	149	92.4	89.9	148.0
Hydraulic	na	79	67	na	34.3	53.3
Mechanical	na	19	82	na	55.6	94.6
Punching & shearing	605	758	845	271.1	295.7	345.9
Metal forming n.e.c.	162	131	589	136.8	54.6	101.8

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)
Note: na = not available, n.e.c = not elsewhere classified

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
ALL MACHINE TOOLS	146,950	161,267	173,503	322,589	$3,593.0	$4,070.0	$4,236.8	$5,016.4
of which NC	6,206	8,371	8,593	8,822	1,342.7	1,904.4	1,899.8	2,324.3
METAL CUTTING	115,714	111,309	123,310	128,686	2,325.5	2,631.9	2,769.3	3,203.6
of which NC	5,520	7,369	7,433	7,716	1,140.0	1,625.3	1,645.1	1,977.2
Drilling machines	11,682	14,211	16,226	13,410	67.2	51.2	63.4	76.6
of which NC	253	158	136	155	38.2	23.0	27.3	36.6
Milling machines	6,395	5,491	6,191	5,983	322.6	334.4	362.2	382.4
of which NC	1,875	1,858	2,049	1,917	248.1	260.3	290.2	305.1
Shape, slot, saw, cut–off, plane	8,100	11,624	14,959	12,574	95.9	141.6	135.4	176.5
of which NC	58	210	238	255	5.2	14.9	16.1	24.6
Lathes	5,462	5,598	5,952	5,761	542.4	629.3	635.9	701.1
of which NC	1,677	1,994	2,073	2,108	401.1	496.0	504.3	558.7
Boring, bore–mill	490	638	555	556	140.5	125.7	101.4	72.6
of which NC	311	220	185	161	125.8	105.5	83.7	60.1
Grinding, polishing	78,091	65,199	70,806	82,875	581.7	567.6	568.8	745.0
of which NC	657	868	786	961	178.7	235.1	211.4	357.2
Physico–chemical	670	1,932	1,944	2,077	60.2	115.6	152.6	154.7
of which NC	346	714	594	597	46.1	99.5	102.6	102.6
Gear cutting	587	755	709	685	90.5	120.3	127.1	185.8
of which NC	92	155	134	210	41.8	65.6	54.9	112.7
Jig boring	309	na	na	na	57.5	na	na	na
of which NC	251	na	na	na	54.9	na	na	na
Threading & tapping	2,557	3,389	3,532	2,338	11.3	11.8	12.8	15.2
Machining centers	780(b)	1,678(b)	1,238	1,306	337.8(b)	512.9(b)	354.7	385.3
Transfer machines	(c)	(c)	399	586	(c)	(c)	233.2	288.2
Metal cutting n.e.c.	548	794	799	535	18.0	21.4	21.7	20.2
METAL FORMING	27,677	43,226	43,623	47,475	964.0	1,083.2	1,152.6	1,401.7
of which NC	686	1,002	1,160	1,106	202.7	279.1	254.8	347.1
Presses	7,355	6,604	7,743	8,521	277.0	306.1	336.2	363.0
of which NC	140	154	149	145	59.4	48.8	42.4	47.5
Bending & forming	5,183	12,621	10,705	10,869	90.8	133.2	154.8	179.5
of which NC	129	279	344	263	10.8	41.7	48.6	52.6
Punching & shearing	5,815	16,700	17,884	20,172	192.1	273.0	260.5	336.8
of which NC	407	550	643	667	118.2	173.0	158.1	195.8
Forging, hammers	221	372	404	319	44.1	41.8	47.0	95.7
of which NC	10	19	24	31	14.3	15.6	5.7	27.3
Drawing machines	569	767	790	1,087	77.4	82.0	111.0	133.9
Thread rolling mach.	180	178	192	173	6.3	8.4	9.0	17.5
Wire working mach.	4,260	2,510	3,277	3,440	171.6	121.2	137.2	154.0
Metal forming n.e.c.	4,094	3,474	2,628	2,894	104.6	117.5	96.9	121.4
Machine tools n.e.c.	3,559	6,732	6,570	146,428	303.5	355.0	314.9	411.0
Parts & accessories	na	na	na	na	658.6	622.6	644.9	830.7

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: na – not available, n.e.c. – not elsewhere classified, (b) –includes "transfer machines," (c) – included in "machining centers"

Metal Cutting Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$2,011.6	$2,325.5	$2,631.9	$2,769.3	$3,203.6
Argentina	3.0	7.5	4.9	4.7	17.3
Australia	18.9	13.9	11.5	7.2	8.8
Austria	127.3	128.4	200.3	153.6	163.4
Belgium–Luxembourg	53.2	84.5	73.5	76.2	86.8
Brazil	17.6	29.5	38.1	34.7	36.9
Bulgaria	43.0	65.1	40.0	24.3	8.5
Canada	26.5	41.0	28.0	34.1	37.8
China	112.6	79.5	55.6	57.9	88.3
Czechoslovakia	21.2	32.5	37.1	53.9	41.3
Denmark	34.9	30.1	28.4	24.8	39.3
France	146.5	175.7	262.5	261.8	381.9
Greece	(b)	3.6	5.0	3.1	3.6
Hungary	7.4	19.6	13.1	13.3	18.1
India	37.0	57.1	44.9	43.7	43.2
Indonesia	2.8	6.1	4.3	3.0	2.9
Iran	20.2	51.1	92.1	66.9	89.7
Iraq	(b)	(b)	59.3	57.8	23.1
Ireland	4.1	2.9	2.3	4.7	5.0
Israel	8.3	6.9	2.1	2.1	4.5
Italy	88.3	202.7	174.5	196.1	239.1
Japan	61.9	36.1	35.8	51.4	113.8
Mexico	17.2	14.5	20.5	9.7	13.5
Netherlands	68.1	71.3	69.9	69.6	98.3
Norway	17.6	9.4	10.8	6.7	8.2
Poland	17.5	24.3	32.5	39.9	45.1
Portugal	4.4	4.7	9.8	8.0	12.1
Romania	1.4	(a)	(a)	(a)	1.1
Singapore	4.6	6.3	5.6	9.8	17.0
South Africa	6.3	5.6	13.4	23.4	22.6
South Korea	30.2	32.6	63.9	60.9	72.3
Spain	15.1	30.2	46.5	49.8	147.7
Sweden	77.2	89.3	93.6	153.4	131.7
Switzerland	135.7	169.9	157.2	155.3	222.4
Taiwan	7.4	14.8	10.0	15.9	13.9
Turkey	(b)	(b)	(b)	24.4	18.8
United Kingdom	141.8	134.0	178.3	165.9	197.5
United States	285.7	314.0	222.3	303.7	328.4
USSR	207.7	170.1	362.3	352.7	256.5
Venezuela	1.4	5.1	5.2	9.7	1.5
Yugoslavia	53.6	69.6	42.0	59.4	40.0
All other countries	84.0	85.9	74.8	75.8	101.7

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: (a) – less than $50,000, (b) – included in "all other countries," na = not available
Totals for individual countries exclude other metalworking machinery and exclude parts.

Metal Forming Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$869.4	$980.7	$1,122.1	$1,152.6	$1,401.7
Argentina	1.5	2.6	6.6	4.7	3.1
Australia	9.1	12.3	7.6	7.2	13.7
Austria	34.3	41.9	52.2	41.2	63.4
Belgium–Luxembourg	22.3	33.3	42.9	36.7	48.1
Brazil	9.9	11.3	9.4	6.0	14.3
Bulgaria	12.0	14.8	21.4	5.9	2.6
Canada	44.7	48.2	9.6	13.1	13.2
China	72.4	68.7	44.8	40.3	30.4
Czechoslovakia	17.1	19.0	15.1	17.5	22.7
Denmark	11.0	8.9	13.8	11.8	14.9
France	55.6	72.9	83.3	89.0	139.7
Greece	(b)	2.5	4.1	8.4	2.8
Hungary	3.6	6.3	4.8	7.3	9.6
India	21.8	15.2	19.9	13.6	35.9
Indonesia	2.0	3.4	5.0	7.0	4.3
Iran	10.9	36.4	44.8	17.6	17.9
Iraq	(b)	(b)	35.1	18.8	6.9
Ireland	2.8	2.7	4.0	3.3	7.6
Israel	5.6	6.3	8.3	3.2	5.7
Italy	41.3	67.1	96.2	124.1	114.0
Japan	23.4	23.7	18.7	38.7	65.0
Mexico	8.6	7.5	3.5	4.9	6.2
Netherlands	42.5	42.1	44.5	46.4	57.1
Norway	10.0	10.4	9.3	4.0	4.3
Poland	8.9	14.5	18.4	19.4	46.7
Portugal	2.5	4.0	10.6	5.6	13.4
Romania	0.1	0.6	0.8	(a)	0.3
Singapore	1.2	3.2	2.5	4.3	6.4
South Africa	3.4	5.4	8.9	7.7	10.9
South Korea	13.1	18.8	18.5	48.4	37.1
Spain	13.4	23.6	30.7	56.7	63.0
Sweden	18.8	25.8	51.0	36.7	40.7
Switzerland	47.4	49.4	55.7	65.1	76.6
Taiwan	4.4	9.5	16.7	15.2	21.8
Turkey	(b)	(b)	(b)	6.6	13.1
United Kingdom	40.9	51.8	69.2	63.5	89.6
United States	114.9	64.2	58.0	77.6	86.4
USSR	59.9	53.7	84.4	94.5	77.8
Venezuela	3.4	1.4	7.2	3.8	4.2
Yugoslavia	13.3	29.4	16.4	12.7	18.1
All other countries	61.4	67.9	68.2	64.1	92.2

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: (a) – less than $50,000, (b) – included in "all other countries," na – not available
Totals for individual countries exclude other metalworking machinery and exclude parts.

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GERMANY

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	124,884	126,150	129,841	143,599	153,724	$5,185.3	$6,402.5	$6,572.2	$6,867.7	$8,733.9
METAL CUTTING TOTAL	82,354	78,519	80,492	91,640	91,713	3,743.6	4,652.6	4,728.8	4,783.5	6,238.6
Plane, shape, broach	404	273	252	275	278	27.0	27.4	36.5	30.8	39.4
Automatic & turret lathes	3,274	2,738	2,436	2,936	3,293	467.1	642.2	618.4	667.0	761.5
Other lathes	6,892	6,723	7,367	8,374	4,283	377.9	424.7	452.7	450.5	554.5
Drilling machines	15,212	16,633	14,980	14,770	19,335	139.1	152.7	155.0	153.1	163.3
Milling machines, horizontal boring–milling machines	8,883	8,233	7,648	9,132	9,393	653.0	724.0	775.4	801.7	905.3
Saws and filing machines	11,446	8,856	7,686	9,163	9,677	112.2	120.7	142.3	174.2	229.9
Grind., hone, polish	16,338	16,989	19,965	20,738	25,223	668.7	850.1	827.3	879.3	1,134.4
Gear cutting machines	1,133	1,040	964	919	860	186.0	233.1	230.8	229.0	310.3
Metal cutting n.e.c.	18,772	17,024	19,194	25,333	19,371	1,112.7	1,477.6	1,490.4	1,398.0	2,140.0
METAL FORMING TOTAL	42,530	47,631	49,349	51,959	62,011	1,441.7	1,749.9	1,843.4	2,084.2	2,495.3
Hammers, forge, rivet., bend. & strght. machines	4,079	3,861	3,794	3,633	2,912	151.6	210.7	205.3	254.4	233.2
Mechanical presses	13,841	11,342	11,654	14,451	13,882	267.1	335.5	307.0	398.1	435.6
Hydraulic presses	2,165	1,931	2,334	2,577	2,752	255.5	276.6	296.9	332.7	383.9
Sheet metal working, including shears	14,509	13,998	14,583	14,922	24,617	467.9	541.8	612.7	682.9	777.9
Wire working machines	7,526	15,991	16,577	15,988	15,348	242.5	306.9	324.5	359.2	472.6
Bolt, screw, nut making machines	410	537	407	388	377	57.1	78.3	97.0	56.8	77.0
Metal forming n.e.c.	—	—	—	—	2,123	—	—	—	—	115.0
Metal cutting parts & accessories	—	—	—	—	—	531.4	654.4	681.7	745.8	959.7
Metal forming parts & accessories	—	—	—	—	—	276.7	327.4	331.4	316.3	472.0

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Notes: Totals include some unclassified items. Individual items may not add up to totals due to rounding.

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Imports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	345,590	425,651	345,909	316,145	$1,204.3	$1,266.9	$1,479.2	$2,131.8
of which NC	5,270	7,220	8,696	11,312	621.7	666.2	807.9	1,188.8
METAL CUTTING TOTAL	324,806	388,783	306,268	280,534	891.1	939.3	1,102.2	1,595.6
of which NC	4,664	6,454	7,524	9,733	552.6	601.5	706.4	1,036.2
Drilling machines	148,047	175,857	102,228	75,580	60.9	35.3	30.9	42.1
of which NC	535	213	297	360	39.2	14.0	13.7	20.2
Milling machines	6,087	6,695	4,797	6,570	135.6	91.0	97.1	139.6
of which NC	849	803	758	1,287	96.9	50.4	57.1	86.6
Shape, slot, saw, cut–off, plane	8,776	11,319	10,940	12,995	24.3	25.1	30.4	47.1
of which NC	20	149	150	238	2.0	4.4	na	8.9
Lathes	9,501	9,629	10,155	12,887	217.8	224.0	295.6	425.5
of which NC	1,467	2,187	2,736	3,480	135.7	153.2	212.9	308.3
Boring, bore–mill	521	1,909	2,917	2,366	61.8	75.8	98.4	130.5
of which NC	284	614	617	684	53.6	60.8	70.2	93.8
Grinding, polishing	148,526	177,956	168,322	160,125	211.5	193.2	179.9	264.5
of which NC	454	605	604	714	90.1	99.5	85.8	133.7
Physico–chemical	1,038	1,829	2,742	3,724	95.8	120.0	165.9	222.3
of which NC	794	1,033	1,116	1,277	85.1	99.8	113.7	149.3
Gear cutting machines	80	134	159	152	17.4	24.8	20.5	35.7
of which NC	17	43	47	57	5.6	18.4	14.7	26.0
Jig boring machines	267	na	na	na	45.7	na	na	na
of which NC	243	na	na	na	44.3	na	na	na
Threading or tapping	835	1,099	1,233	2,936	2.3	3.9	3.9	5.9
Machining centers	na	1,058(b)	1,199	1,607	na	138.7(b)	134.3	199.6
Transfer machines	na	(c)	227	352	na	(c)	37.2	64.3
Metal cutting n.e.c.	1,128	1,298	1,364	1,240	18.0	7.5	9.9	18.3
METAL FORMING TOTAL	15,498	33,190	36,272	33,000	275.1	276.1	316.3	472.5
of which NC	607	766	1,172	1,579	69.1	64.7	101.4	152.6
Presses	3,691	3,904	3,802	3,420	76.1	67.1	64.8	100.9
of which NC	247	135	1,532	64	25.6	10.4	32.4	17.2
Bending & forming	3,499	6,187	6,677	6,499	47.8	68.2	82.8	125.8
of which NC	224	318	554	781	23.8	25.9	40.5	60.3
Punching & shearing	4,137	17,822	19,602	18,998	53.4	70.6	100.7	138.9
of which NC	135	296	406	728	19.6	27.4	47.0	68.3
Forging, hammers	150	352	529	289	5.4	10.3	9.9	22.2
of which NC	1	17	9	6	0.2	1.0	0.8	6.8
Drawing machines	217	386	1,027	168	4.2	10.2	7.2	5.3
Thread rolling mach.	166	165	150	141	1.5	3.0	2.5	3.5
Wire working mach.	945	1,390	1,333	1,503	52.2	26.1	24.1	47.8
Metal forming n.e.c.	2,693	2,984	3,417	1,982	34.4	20.6	28.9	28.1
Machine tools n.e.c	5,286	3,678	3,369	2,611	38.2	51.6	60.7	63.7
Parts and accessories	na	na	na	na	367.5	340.0	369.2	589.8

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: na – not available, n.e.c. – not elsewhere classified, (b) – includes "transfer machines," (c) – included in "machining centers"

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Metal Cutting Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$778.6	$891.1	$939.3	$1,102.2	$1,595.6
Switzerland	260.6	302.1	289.9	304.5	442.7
Japan	192.7	162.6	217.5	286.8	352.1
Italy	79.9	93.1	95.2	103.1	196.0
United Kingdom	30.3	39.8	56.8	58.0	102.6
Austria	34.8	50.2	47.4	60.0	94.8
United States	19.3	37.0	30.2	40.8	66.6
Spain	22.2	29.5	30.1	38.9	62.9
France	31.5	31.7	23.5	39.7	50.9
Taiwan	14.0	24.6	29.7	31.0	39.7
Sweden	17.5	31.8	27.7	25.0	38.7
Netherlands	7.9	17.1	20.7	16.8	18.1
China	4.9	9.2	10.2	14.7	16.9
Czechoslovakia	13.1	9.7	9.2	13.7	13.5
Yugoslavia	4.2	4.4	4.6	6.6	12.2
Poland	3.9	4.9	3.6	5.3	8.9
USSR	4.8	5.3	5.8	9.4	8.4
Belgium–Luxembourg	8.5	11.5	8.2	9.6	7.7
All other countries	28.5	26.6	29.0	38.3	62.9

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

GERMANY

Metal Forming Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$242.7	$283.4	$300.2	$316.3	$472.5
Switzerland	71.9	85.2	67.9	67.3	100.0
Italy	47.5	55.7	47.5	56.4	96.3
France	13.3	17.8	22.1	28.7	41.7
Belgium–Luxembourg	15.8	16.1	20.9	17.9	33.2
Netherlands	10.3	14.9	14.7	21.8	32.4
United States	18.9	15.8	31.8	30.8	31.1
Japan	22.9	20.1	27.0	14.0	21.0
Austria	8.7	15.1	12.1	15.4	21.0
Spain	8.7	10.3	11.5	16.1	20.5
United Kingdom	6.8	8.4	13.0	12.0	18.5
Denmark	3.8	5.6	8.9	8.9	13.3
Sweden	4.4	5.8	6.1	6.1	12.5
All other countries	9.7	12.6	16.7	20.9	31.0

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: Figures for 1987 and 1988 include some other metalworking machinery.

Exports by Type of Machine and Destination, 1990

(millions of U.S. dollars)

	MACHINE TOOL TOTAL	BORING MACHINES	MILLING MACHINES	SHAPE, SLOT,SAW, BROACH	LATHES	GRIND, HONE, POLISH	BORING MILLING	PHYSICO–CHEMICAL MACHINES	GEAR CUTTING MACHINES	MACHINING CENTERS	NON–NC TRANSFER
TOTAL	$5,016.4	$82.4	$382.4	$176.5	$701.1	$745.0	$66.8	$154.7	$185.8	385.3	213.6
Austria	238.1	3.2	27.0	10.0	30.2	29.5	5.3	14.3	4.0	28.8	4.9
Belgium–Luxem.	142.8	2.7	13.8	5.4	22.5	14.1	0.6	2.6	3.5	19.8	0.3
Brazil	53.4	0.2	5.8	0.6	6.3	12.5	0.1	0.3	3.6	6.7	–
Canada	51.9	0.2	2.4	3.7	7.1	18.1	0.2	0.9	0.1	4.8	–
China	137.7	1.7	7.0	0.2	4.9	42.4	7.0	1.1	2.6	15.8	1.1
Czechoslovakia	67.2	0.7	6.2	4.5	6.6	7.8	0.1	9.3	1.5	1.2	0.6
Denmark	55.7	1.3	3.4	2.7	13.2	6.1	0.1	4.0	1.4	5.3	–
France	542.0	13.4	50.6	34.1	102.9	54.6	8.2	24.3	25.8	46.0	12.0
India	92.8	0.6	10.1	3.4	4.3	18.6	1.8	0.1	1.8	1.8	–
Iran	112.3	8.1	17.0	1.3	25.0	27.9	–	0.3	2.9	6.8	–
Iraq	68.8	(a)	9.0	0.6	2.5	1.6	4.0	(a)	0.8	4.4	–
Italy	367.6	4.4	27.0	10.4	52.2	37.6	4.3	28.5	20.2	24.7	24.8
Japan	197.3	3.1	1.7	9.6	17.5	46.6	2.1	4.1	17.0	0.8	8.4
Netherlands	162.6	5.4	21.2	10.5	19.9	17.5	1.3	[illegible]	0.8	13.7	0.2
Poland	95.9	2.9	2.1	2.1	13.4	10.8	1.3	2.0	3.2	5.4	–
South Korea	112.6	1.0	9.5	1.4	5.8	29.2	2.1	0.3	10.8	4.6	2.4
Spain	223.3	1.8	13.8	6.5	35.0	23.1	0.1	3.5	[illegible]	11.7	29.5
Sweden	174.2	2.3	8.7	6.6	35.2	21.1	1.6	2.4	6.3	13.8	18.9
Switzerland	308.0	6.5	30.9	11.8	57.1	40.4	7.2	11.7	5.1	46.0	0.2
Taiwan	43.5	0.1	2.5	0.3	2.8	4.9	–	0.6	9.2	1.8	–
United Kingdom	332.7	7.5	15.4	20.1	38.3	39.6	4.5	4.2	4.3	35.3	21.4
United States	425.7	4.3	22.7	12.6	41.2	95.1	7.4	9.6	33.3	35.8	47.6
USSR	432.8	1.4	28.4	1.8	81.7	65.7	2.0	8.6	5.7	14.2	40.0
Yugoslavia	63.1	2.0	5.5	0.9	9.0	13.8	0.7	1.8	(a)	6.1	0.2
Other countries	514.5	7.6	40.7	15.4	66.2	66.2	4.5	13.8	11.7	30.5	1.2

(continued)

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Exports by Type of Machine and Destination, 1990
(continued)

(millions of U.S. dollars)

	METAL CUTTING N.E.C.	METAL CUTTING TOTAL	PRESSES	BEND, FOLD, PR. BRAKES	PUNCH AND SHEAR	FORGING MACHINES	DRAWING MACHINES	WIRE WORKING MACHINES	METAL FORMING N.E.C.	METAL FORMING TOTAL	MACHINE TOOLS N.E.C.
TOTAL	$20.2	$3,203.6	$363.0	$179.5	$336.8	$95.7	$133.9	$154.0	$121.4	$1,401.7	$411.0
Austria	1.6	163.4	13.8	11.6	24.8	1.5	1.7	2.6	7.0	63.4	11.3
Belgium–Luxem.	0.8	86.8	5.1	8.4	17.6	0.4	6.3	4.4	5.8	48.1	7.9
Brazil	0.5	36.9	3.5	2.8	4.7	0.6	0.2	0.7	1.4	14.3	2.2
Canada	(a)	37.8	2.4	0.9	0.7	–	2.4	6.2	0.3	13.2	0.9
China	0.1	88.3	12.6	1.3	0.9	3.0	6.3	2.6	3.4	30.4	19.1
Czechoslovakia	0.7	41.3	4.1	3.4	4.6	4.7	2.2	1.7	1.9	22.7	3.1
Denmark	(a)	39.3	2.6	2.7	7.1	–	0.2	0.8	1.1	14.9	1.5
France	1.6	381.9	44.3	12.0	40.0	13.3	2.7	8.6	16.1	139.7	20.4
India	0.2	43.2	3.9	0.3	0.9	22.3	0.6	7.5	0.4	35.9	13.7
Iran	0.1	89.7	3.3	2.1	4.2	0.9	2.4	3.8	0.7	17.9	4.6
Iraq	–	23.1	1.8	0.9	1.8	–	–	0.9	1.6	6.9	38.8
Italy	0.7	239.1	30.1	15.2	32.2	3.9	17.2	5.9	8.7	114.0	14.5
Japan	1.5	113.8	10.0	6.8	18.3	7.4	6.4	5.4	10.6	65.0	18.4
Netherlands	0.4	98.3	9.9	9.7	22.8	2.3	2.4	7.6	2.3	57.1	7.3
Poland	0.6	45.1	15.9	2.5	3.0	9.5	6.2	2.1	6.9	46.7	4.0
South Korea	(a)	72.3	12.6	8.6	4.4	3.3	5.8	2.0	0.3	37.1	3.1
Spain	2.1	147.7	30.6	2.3	10.9	2.7	2.6	5.7	4.2	63.0	12.6
Sweden	1.5	131.7	9.6	7.4	12.6	(a)	2.8	3.9	3.7	40.7	1.9
Switzerland	1.1	222.4	18.2	14.9	20.8	2.0	8.3	7.7	3.9	76.6	9.0
Taiwan	0.6	13.9	4.6	2.9	1.8	0.4	4.6	4.1	3.3	21.8	7.8
United Kingdom	2.3	197.5	36.0	9.3	20.8	8.2	1.3	5.8	7.8	89.6	45.6
United States	1.2	328.4	16.2	9.7	28.2	0.6	4.8	20.2	5.4	86.4	10.8
USSR	0.7	256.5	23.4	7.8	8.4	(a)	14.4	14.7	6.3	77.8	98.5
Yugoslavia	(a)	40.0	1.5	2.6	2.6	4.9	0.5	1.4	4.5	18.1	5.0
Other countries	1.7	265.3	47.1	33.5	42.7	3.9	29.2	27.6	13.8	200.2	48.9

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: (a) – less than $50,000, n.e.c. – not elsewhere classified, "Metal cutting total" includes "threading or tapping machines" and "NC transfer machines," neither of which are detailed in this table; "Metal forming total" includes "thread rolling machines" not detailed in table.

Imports by Type of Machine and Country of Origin, 1990

(millions of U.S. dollars)

	MACHINE TOOL TOTAL	BORING MACHINES	MILLING MACHINES	SHAPE, SLOT,SAW, BROACH	LATHES	GRIND, HONE, POLISH	BORING MILLING	PHYSICO-CHEMICAL MACHINES	GEAR CUTTING MACHINES	MACHINING CENTERS	NON-NC TRANSFER
TOTAL	$2,131.8	$42.1	$139.6	$47.1	$425.5	$264.5	$130.5	$222.3	$35.7	$199.6	$48.6
Austria	119.1	0.3	10.7	2.1	45.9	15.6	2.0	0.9	(a)	3.1	12.3
Belgium–Luxem.	41.2	0.3	0.9	0.2	1.4	0.4	1.6	1.8	(a)	—	0.1
Brazil	13.7	1.8	0.1	(a)	9.4	(a)	0.4	0.2	0.1	0.8	—
Czechoslovakia	18.1	0.5	2.9	0.1	3.3	1.5	5.0	—	0.1	—	—
Denmark	21.9	0.2	1.2	0.3	1.1	4.2	0.3	0.1	—	0.1	(a)
France	93.9	1.3	17.8	5.2	11.0	5.0	0.6	5.8	0.2	0.8	2.0
Italy	305.2	3.9	22.8	19.6	60.6	34.4	15.9	4.0	0.4	12.7	7.5
Japan	377.6	7.4	3.0	3.7	151.6	3.8	10.8	63.8	—	106.2	0.3
Netherlands	53.6	0.7	1.4	1.6	2.1	5.5	0.6	0.3	0.1	5.2	(a)
Spain	84.0	4.3	23.4	3.0	10.4	3.8	7.5	0.2	—	9.4	0.8
Sweden	52.2	1.2	1.6	0.6	7.7	22.2	2.4	0.8	0.1	1.3	—
Switzerland	569.3	8.8	27.1	5.7	45.5	116.0	66.9	102.9	27.2	11.9	17.7
Taiwan	41.5	4.0	2.2	0.7	15.5	4.9	1.6	1.9	—	8.9	—
United Kingdom	122.7	2.4	4.6	1.0	26.0	19.4	10.8	3.9	0.8	26.4	6.5
USSR	10.8	0.5	1.8	—	1.4	4.4	0.2	(a)	—	—	—
United States	102.3	0.4	4.9	0.7	3.6	11.3	1.2	29.9	5.6	6.6	1.4
Yugoslavia	13.5	0.6	3.1	0.5	4.2	2.1	1.3	(a)	0.1	0.4	—
All other countries	91.2	3.5	10.2	2.1	24.8	9.9	1.4	6.0	1.0	5.9	—

(continued)

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Imports by Type of Machine and Country of Origin, 1990
(continued)

(millions of U.S. dollars)

	METAL CUTTING N.E.C.	METAL CUTTING TOTAL	PRESSES	BEND, FOLD, PR. BRAKES	PUNCH AND SHEAR	FORGING MACHINES	DRAWING MACHINES	WIRE WORKING MACHINES	METAL FORMING N.E.C.	METAL FORMING TOTAL	MACHINE TOOLS N.E.C.
TOTAL	$18.3	$1,595.6	$100.9	$125.8	$138.9	$22.2	$5.3	$47.8	$28.1	$472.5	$63.7
Austria	0.2	94.8	5.7	6.8	1.9	0.2	0.6	4.8	0.9	21.0	3.2
Belgium–Luxem.	0.1	7.7	7.4	11.9	11.7	0.2	0.2	0.6	1.0	33.2	0.3
Brazil	—	12.8	0.1	(a)	0.2	—	0.5	0.1	—	0.9	0.1
Czechoslovakia	(a)	13.5	1.5	0.1	0.7	1.6	—	0.1	0.6	4.6	—
Denmark	0.2	8.0	1.3	6.5	5.0	(a)	(a)	0.1	0.4	13.3	0.6
France	1.0	50.9	5.6	13.6	17.1	0.5	0.3	3.5	0.9	41.7	1.3
Italy	11.3	196.0	25.1	21.0	20.3	7.1	1.3	6.4	14.0	96.3	12.9
Japan	0.3	352.1	4.3	4.1	7.7	1.8	(a)	2.5	0.6	21.0	4.5
Netherlands	0.2	18.1	6.2	12.4	9.2	2.4	(a)	0.5	1.5	32.4	3.1
Spain	0.1	62.9	4.6	1.6	6.9	0.4	(a)	5.1	1.4	20.5	0.5
Sweden	0.5	38.7	5.5	2.7	1.8	(a)	0.2	2.1	0.1	12.5	0.9
Switzerland	2.6	442.7	14.9	29.0	33.2	6.2	0.4	10.4	5.2	100.0	26.7
Taiwan	(a)	39.7	1.7	0.1	(a)	—	—	(a)	—	1.8	(a)
United Kingdom	0.5	102.6	5.5	6.0	3.3	0.9	0.5	1.7	0.6	18.5	1.7
United States	0.9	66.6	6.4	3.0	13.2	0.1	0.6	7.2	0.3	31.1	4.6
USSR	(a)	8.4	0.6	1.4	—	0.5	—	—	—	2.4	(a)
Yugoslavia	(a)	12.2	0.4	0.4	0.4	—	—	(a)	(a)	1.2	(a)
All other countries	0.3	67.9	4.3	5.3	6.4	0.3	0.7	2.5	0.6	20.1	3.2

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)

Note: (a) – less than $50,000, n.e.c. – not elsewhere classified. "Metal cutting total" includes "threading or tapping machines" and "NC transfer machines," neither of which are detailed in this table; "Metal forming total" includes "thread rolling machines" not detailed in table.

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NC Imports and Exports by Type of Machine

(millions of U.S. dollars)

	IMPORTS				EXPORTS			
	UNITS		VALUE		UNITS		VALUE	
	1989	1990	1989	1990	1989	1990	1988	1990
MACHINE TOOL TOTAL	8,696	11,312	$807.9	$1,188.8	8,593	8,822	$1,899.8	$2,324.3
METAL CUTTING TOTAL	7,524	9,733	706.4	1,036.2	7,433	7,716	1,645.1	1,977.2
Physico–chemical machines	1,116	1,277	113.7	149.3	594	597	102.6	102.6
EDM	979	1,136	96.3	123.7	563	569	95.0	94.5
Ultrasonic	3	7	0.7	0.8	2	1	0.3	0.2
Other	134	134	16.7	24.9	29	27	7.4	7.9
Machining centers	1,199	1,607	134.3	199.6	1,238	1,306	354.7	385.3
Lathes	2,736	3,480	212.9	308.3	2,073	2,108	504.3	558.7
Horiz. multiple spindle	803	1,043	70.5	92.2	641	754	125.6	169.3
Horiz. single spindle	637	461	28.0	32.2	625	647	145.3	153.9
Capstan, turret, automatic	844	1,226	80.5	124.7	524	489	119.0	132.3
Other horizontal	193	261	13.4	23.1	114	75	27.2	16.0
Vertical lathes	43	138	4.7	12.5	108	80	74.5	71.6
Other lathes	216	351	15.8	23.6	61	63	12.6	15.6
Drilling machines	297	360	13.7	20.2	136	155	27.3	36.6
Radial	35	38	0.9	0.8	14	17	0.5	1.0
Multiple–spindle	77	20	1.3	1.1	55	59	14.5	19.3
Other	185	302	11.5	18.4	67	79	12.2	16.4
Milling machines	758	1,287	57.1	86.6	2,049	1,917	290.2	305.1
Knee type	106	94	8.2	9.5	49	49	7.7	9.7
Plano–milling	20	103	3.0	11.4	37	28	37.4	8.7
Tool milling	351	478	25.2	41.9	1,823	1,704	215.0	237.4
Other	281	612	20.7	23.8	140	136	30.1	49.4
Sawing & cut–off	147	235	3.9	7.3	235	251	15.4	24.4
Circular	53	155	0.6	2.8	73	95	5.2	11.0
Other	94	80	3.3	4.5	162	156	10.3	13.4
Planing machines	3	3	0.2	1.6	3	4	0.6	0.2

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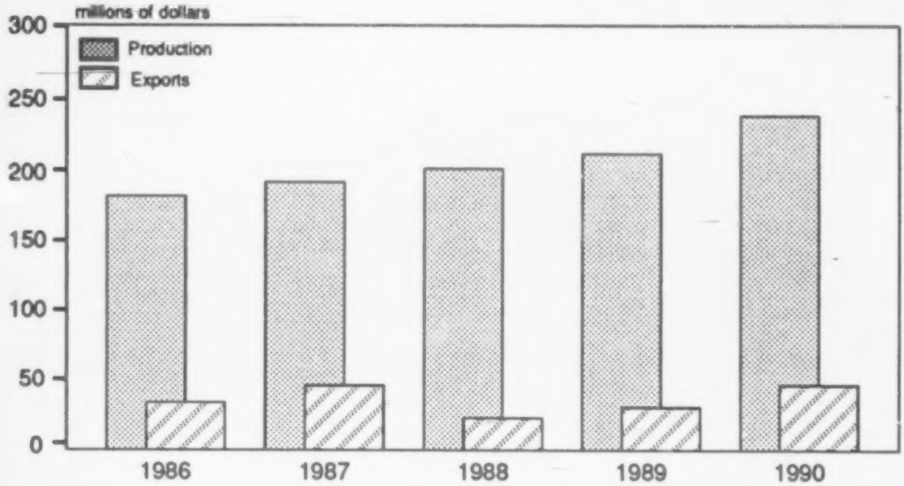
INDIA *Production and Exports*



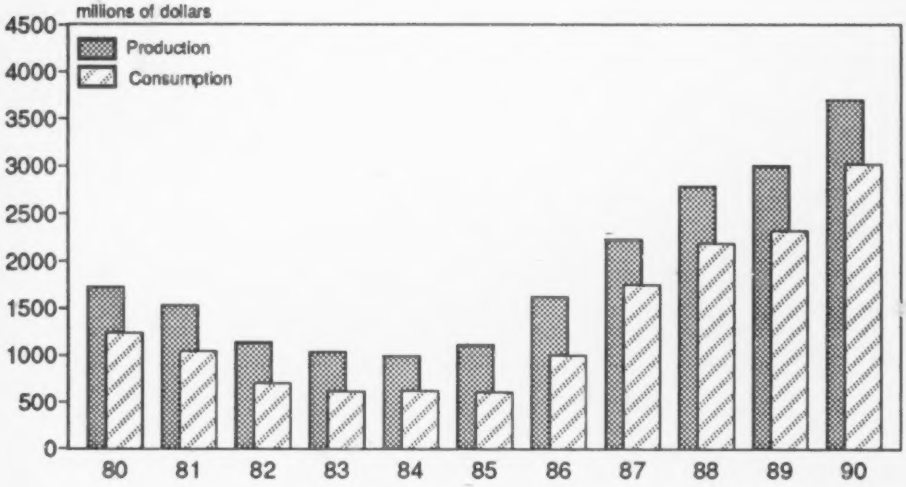
INDIA *Exports by Type of Machine*

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	$33.4	$45.7	$22.6	$30.4	$46.2
Lathes	11.6	7.8	8.1	14.2	10.8
Boring machines	1.7	2.4	0.1	(a)	0.2
Broaching machines	—	0.3	—	(a)	—
Drilling machines	0.3	0.7	0.3	0.4	0.6
Grinding machines	10.8	8.8	6.9	1.9	3.9
Milling machines	4.0	6.9	2.7	5.5	11.0
Threading machines	0.4	0.2	0.1	(a)	—
Sawing & cut–off machines	(a)	(a)	(a)	(a)	0.2
Shaping machines	—	(a)	0.2	(a)	—
Gear cutting machines	—	0.8	1.6	1.8	3.9
Electro–chemical machines	(a)	0.3	1.8	2.4	3.8
Machining centers	3.4	7.0	—	—	0.4
Presses	0.8	(a)	0.1	3.5	11.4
Shearing machines	(a)	(a)	—	(a)	(a)
Wire forming machines	0.1	0.4	0.5	0.3	—
Machine tools n.e.c.	0.2	0.1	0.3	0.3	0.1

Source: Indian Machine Tool Manufacturers' Association

Note: (a) – less than $50,000, n.e.c. – not elsewhere classified



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1975	$842.5	$212.9	$432.1	$623.3	34.2%	51.3%	na
1976	750.9	160.5	359.0	552.4	29.1	47.8	na
1977	878.3	192.9	442.4	628.8	30.7	50.4	na
1978	1,060.5	195.0	596.3	659.2	29.6	56.2	na
1979	1,354.0	255.9	689.0	920.9	27.8	50.9	na
1980	1,728.1	356.4	847.6	1,236.9	28.8	49.0	37,200
1981	1,539.4	300.3	795.2	1,044.5	28.8	51.7	36,000
1982	1,138.6	208.6	639.9	707.3	29.3	56.2	33,800
1983	1,037.0	181.8	603.4	615.4	29.0	58.2	30,800
1984	996.0	182.5	558.0	620.5	29.4	56.0	28,500
1985	1,115.5	196.4	707.4	604.5	32.5	63.4	28,200
1986	1,624.6	346.8	969.7	1,001.7	34.6	59.7	28,700
1987	2,235.2	566.5	1,048.5	1,753.2	32.3	46.9	30,500
1988	2,792.7	706.1	1,309.4	2,189.4	32.2	46.9	31,000
1989	3,004.9	794.6	1,472.7	2,326.8	34.1	49.0	32,100
1990p	3,705.9	1,054.3	1,740.0	3,020.2	34.9	47.0	32,000

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association
Note: p = preliminary, na – not available

ITALY

Production

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	$1,624.6	$2,235.2	$2,792.7	$3,004.9	$3,705.9
METAL CUTTING TOTAL	1,166.5	1,660.4	2,029.6	2,166.3	2,640.8
Lathes	$199.3	$289.4	$365.5	387.1	na
of which NC	134.3	196.1	257.0	268.8	na
Milling machines	149.9	212.7	213.0	288.9	na
of which NC	124.6	179.0	187.0	265.1	na
Boring machines	44.3	81.2	80.1	61.7	na
Drilling machines	26.4	43.4	52.9	57.9	na
Machining centers	175.5	270.4	328.0	370.5	na
Grinding & polishing machines	100.6	157.9	179.6	173.4	na
Sawing & cut-off machines	58.1	78.4	104.3	122.1	na
Transfer machines	184.7	289.6	330.6	326.0	na
Gear cutting machines	23.1	22.1	32.9	49.7	na
Tool & cutter grinding	10.5	13.2	17.1	(a)	na
Metal cutting n.e.c.	194.3	202.1	325.8	329.0	na
METAL FORMING TOTAL	458.1	574.8	763.1	838.6	1,065.0
Presses	115.8	173.7	216.7	227.1	na
Bending machines	32.5	47.6	63.8	45.3	na
Punching & shearing machines	47.0	63.4	111.0	114.9	na
Forging machines	8.1	9.6	20.4	12.0	na
Folding machines	29.2	43.4	44.4	(b)	na
Bolt, screw, nut making mach.	18.6	23.0	31.4	(b)	na
Wire working machines	28.4	48.5	49.9	45.5	na
Metal forming n.e.c.	178.5	165.7	225.6	393.8	na

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association

Note: n.e.c. – not elsewhere classified, (a) – included in "metal cutting n.e.c.," (b) – included in "metal forming n.e.c.," na – not available

Exports by Type of Machine

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	$969.7	$1,048.5	$1,309.4	$1,472.7	$1,740.0
METAL CUTTING TOTAL	544.0	578.5	799.5	885.5	1,013.2
Physico–chemical machines	1.8	2.2	57.0	33.5	34.8
Machining centers	(a)	(a)	15.4	55.8	77.5
Single station transfer	(a)	(a)	5.9	6.2	5.1
Multi–station transfer	(a)	(a)	77.6	122.1	72.7
Lathes	77.1	95.4	130.1	136.9	188.6
of which NC	35.8	50.1	67.8	58.9	na
Drilling machines	32.3	35.9	66.7	57.8	66.8
of which NC	15.1	19.6	19.7	20.2	na
Boring & boring–milling	44.0	36.1	53.2	57.7	76.0
of which NC	26.4	20.9	27.7	27.7	na
Milling machines	148.0	126.5	115.3	103.9	126.9
of which NC	65.3	81.9	66.8	45.1	na
Threading or tapping	1.9	2.5	15.6	14.8	9.3
Grinding machines	86.4	100.8	119.6	127.9	148.0
Tool & cutter grinding	(b)	(b)	10.0	7.1	13.2
Honing & surfacing	(b)	(b)	9.6	10.3	13.8
Planing machines	2.2	1.4	2.1	1.8	3.3
Shaping & slotting machines	(c)	1.8	1.7	1.4	1.5
Broaching machines	3.4	6.7	6.5	9.2	10.8
Gear cutting machines	6.5	8.5	15.6	22.7	22.0
of which NC	1.0	0.8	3.7	2.3	na
Sawing & cut–off machines	37.2(d)	46.1	51.7	67.4	84.0
Metal cutting n.e.c.	103.2	114.6	45.8	48.9	58.9
METAL FORMING TOTAL	425.6	470.0	509.9	587.0	726.8
Sheet metal centering, straight. & leveling mach.	39.0	47.7	9.2	10.0	18.8
Sheet metal bending mach.			7.5	8.4	18.4
Bending machines			6.4	6.1	12.1
Forging machines	13.0	9.4	26.1	48.3	51.8
Presses	101.0	123.6	146.0	168.7	205.4
of which NC	10.6	9.1	12.9	na	na
Punching machines	44.7	35.2	21.7	34.1	47.8
Shearing machines			30.0	41.6	55.3
Wire drawing machines	20.7	26.3	46.4	37.3	56.3
Thread rolling machines	3.2	3.2	4.8	4.3	4.1
Wire forming machines	15.5	18.5	16.2	22.6	36.7
Metal forming n.e.c.	188.5	206.1	195.7	205.6	220.2

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association

Note: na – not available, n.e.c. – not elsewhere classified, (a) – included in "metal cutting n.e.c." (b) – included in "grinding machines," (c) – included in "sawing & cut–off machines," (d) – includes "shaping and slotting machines"

ITALY

Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$969.7	$1,048.5	$1,309.4	$1,472.7	$1,740.0
West Germany	139.8	157.0	155.3	181.8	316.5
France	118.7	136.3	161.0	193.0	268.6
United States	129.5	85.9	107.5	101.0	101.3
USSR	73.1	77.2	126.8	114.9	95.6
Spain	20.1	53.2	72.2	70.0	90.0
Poland	10.5	9.9	12.1	39.8	78.9
United Kingdom	42.7	38.3	54.6	60.2	77.8
Switzerland	41.6	53.2	46.3	62.3	76.3
China	47.7	28.5	28.6	43.8	55.5
Belgium–Luxembourg	21.8	19.1	26.8	32.6	38.2
Portugal	9.4	9.4	17.3	20.6	28.8
Yugoslavia	13.6	13.8	11.3	23.1	25.8
Sweden	19.1	27.1	31.9	74.2	25.5
Turkey	14.3	19.7	25.2	19.3	25.3
Netherlands	15.1	16.7	15.7	14.7	23.5
Austria	18.5	19.7	19.5	16.4	22.6
Brazil	6.5	16.7	12.7	16.0	22.3
Japan	8.9	7.6	11.9	17.0	21.6
Greece	10.5	9.2	12.1	16.1	17.6
Finland	9.1	6.7	9.7	18.5	16.7
Venezuela	7.0	13.4	26.2	11.4	14.3
Mexico	5.4	5.4	2.8	9.6	13.3
Canada	28.6	16.2	22.6	(b)	(b)
East Germany	1.2	10.1	37.3	52.2	(c)
All other countries	157.0	198.2	262.0	264.2	284.0

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association

Note: (b) – included in "all other countries," (c) – included in "West Germany"
Individual items may not add up to totals due to rounding.

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Imports by Type of Machine

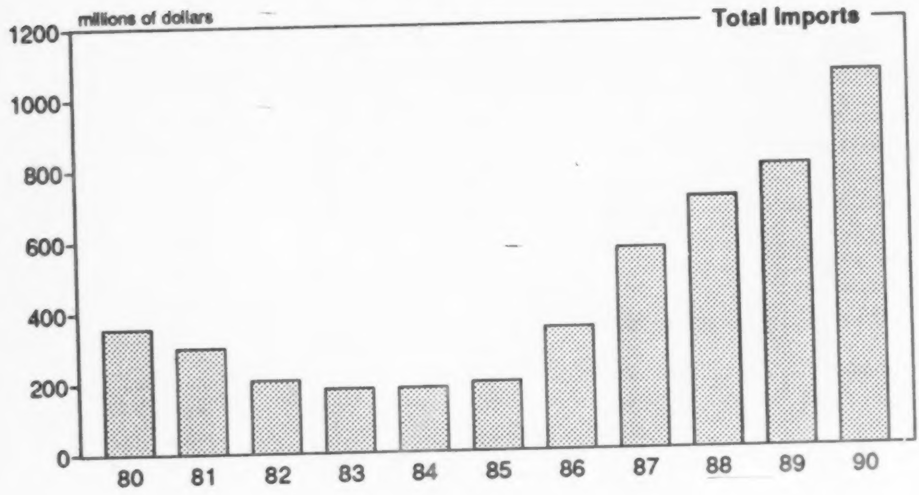
(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	$346.8	$566.5	$706.1	$794.6	$1,054.3
METAL CUTTING TOTAL	252.2	421.1	516.0	589.5	806.8
Physico–chemical machines	32.0	47.8	81.2	80.5	128.5
Machining centers	(a)	(a)	64.8	88.2	121.6
Single station transfer	(a)	(a)	0.9	3.1	2.6
Multi–station transfer	(a)	(a)	12.4	13.3	30.9
Lathes	73.5	118.9	133.0	166.5	195.6
of which NC	51.5	81.0	94.3	118.0	na
Drilling machines	16.2	22.3	15.7	14.9	20.2
of which NC	12.9	15.0	4.5	5.4	na
Boring & boring–milling	9.4	17.9	19.7	19.8	28.2
of which NC	4.2	11.8	13.1	11.0	na
Milling machines	38.2	70.5	67.9	84.0	96.8
of which NC	22.9	43.9	41.3	50.5	na
Threading or tapping	1.7	3.8	6.9	5.9	8.5
Grinding machines	29.2	51.2	52.4	42.5	90.5
Tool and cutter grinding	(b)	(b)	8.4	15.8	16.3
Honing and surfacing	(b)	(b)	7.9	6.4	5.2
Planing machines	0.1	1.7	0.7	0.3	0.8
Shaping & slotting machines	(c)	2.3	0.6	0.6	0.5
Broaching machines	(a)	0.3	0.6	0.3	0.8
Gear cutting machines	7.7	16.5	16.8	21.4	30.4
of which NC	1.0	9.0	7.4	10.8	na
Sawing & cut–off machines	12.9(d)	14.9	12.9	12.9	13.1
Metal cutting n.e.c.	31.4	54.7	13.3	13.2	16.3
METAL FORMING TOTAL	94.6	145.5	190.1	205.1	247.4
Sheet metal centering, straight. & leveling mach.	8.6	14.0	8.4	8.6	9.8
Sheet metal bending mach.			2.4	1.2	2.2
Bending machines			2.4	0.9	4.3
Forging machines	1.4	6.2	15.7	17.4	19.3
Presses	23.3	29.3	45.7	73.5	63.3
of which NC	9.8	12.5	8.2	na	na
Wire drawing machines	3.5	4.6	16.3	12.0	16.2
Thread rolling machines	2.0	1.5	0.7	1.0	1.1
Wire forming machines	5.4	7.4	5.5	6.2	7.8
Punching machines	13.3	30.2	38.4	40.4	49.8
Shearing machines			6.8	8.3	16.0
Metal forming n.e.c.	37.1	52.3	47.9	35.6	57.5

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association

Note: na – not available, n.e.c. – not elsewhere classified, (a) – included in "Metal cutting n.e.c.," (b) – included in "Grinding machines," (c) – included in "Sawing & cut–off machines," (d) – includes "Shaping and slotting machines"

Imports by Country of Origin



(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$346.8	$566.5	$706.1	$794.6	$1,054.3
West Germany	127.4	214.8	255.6	309.4	375.6
Switzerland	72.7	103.8	111.8	102.8	154.1
Japan	28.2	54.5	84.3	101.9	152.1
France	16.1	20.9	41.6	43.5	57.8
Taiwan	2.7	10.5	21.1	34.8	43.2
United Kingdom	18.4	29.1	38.8	36.7	42.1
United States	12.7	20.5	21.8	30.9	40.9
Spain	6.0	14.8	17.4	19.3	28.2
Belgium–Luxembourg	13.9	17.9	20.9	21.5	23.9
Austria	6.5	18.1	9.2	11.7	18.1
East Germany	7.5	10.6	13.7	16.7	17.5
USSR	6.4	8.2	8.9	10.4	13.6
Sweden	9.1	9.2	9.1	6.6	10.0
Czechoslovakia	5.1	8.5	15.2	7.8	9.8
Netherlands	2.7	5.4	7.7	7.0	9.7
All other countries	11.3	19.7	29.0	33.6	57.7

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association

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JAPAN

Metal Cutting Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1970	$867.6	$122.7	$66.9	$923.4	13.3%	7.7%
1971	755.4	113.6	80.1	788.9	14.4	10.6
1972	679.4	74.1	90.8	662.7	11.1	13.0
1973	1,120.1	78.3	129.3	1,069.1	7.3	11.5
1974	1,230.2	127.6	197.8	1,160.0	11.0	16.1
1975	777.4	72.7	207.6	642.5	11.3	26.7
1976	770.9	46.8	256.5	561.2	8.3	33.3
1977	1,165.1	58.5	430.1	793.5	7.4	36.9
1978	1,736.7	93.3	770.4	1,059.6	8.8	44.4
1979	2,208.9	119.6	942.8	1,385.7	8.6	42.7
1980	3,008.2	168.6	1,188.9	1,987.9	8.5	39.5
1981	3,860.3	175.1	1,409.2	2,626.2	6.7	36.5
1982	3,143.0	175.0	994.1	2,323.9	7.5	31.6
1983	2,956.7	136.9	999.7	2,093.9	6.5	33.8
1984	3,711.2	123.2	1,319.9	2,514.5	4.9	35.6
1985	4,406.5	147.5	1,656.1	2,897.9	5.1	37.6
1986	5,337.1	197.3	2,157.6	3,376.8	5.8	40.4
1987	4,762.0	152.6	2,049.0	2,865.6	5.3	43.0
1988	6,875.3	286.6	2,508.7	4,653.2	6.2	36.5
1989	8,257.5	366.0	3,106.6	5,516.9	6.6	37.6
1990	9,001.3	474.1	3,148.0	6,327.4	7.5	35.0

Sources: Japan Ministry of International Trade and Industry; Ministry of Finance

JAPAN

Metal Forming Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1970	$241.5	$37.5	$24.3	$254.7	14.7%	10.1%
1971	202.0	40.6	34.3	208.3	19.5	17.0
1972	216.3	29.2	54.9	190.6	15.3	25.4
1973	360.1	31.6	86.4	305.3	10.4	24.0
1974	420.0	48.6	109.8	358.8	13.5	26.1
1975	284.8	51.3	105.6	230.5	22.3	37.1
1976	294.6	24.1	113.4	205.3	11.7	38.5
1977	438.0	27.5	186.0	279.5	9.8	42.5
1978	613.7	26.8	241.1	399.4	6.7	39.3
1979	687.1	45.0	286.6	445.5	10.1	41.7
1980	818.0	52.5	264.0	606.5	8.7	32.3
1981	936.8	40.4	276.3	700.9	5.8	29.5
1982	653.3	45.3	269.3	429.3	10.6	41.2
1983	588.2	34.1	254.3	368.0	9.3	43.2
1984	761.7	58.4	419.3	400.8	14.6	55.0
1985	910.2	71.5	522.9	458.8	15.6	57.4
1986	1,535.5	75.0	905.8	704.7	10.6	59.0
1987	1,620.6	111.7	985.8	746.5	15.0	60.8
1988	1,793.6	110.5	919.3	984.8	11.2	51.3
1989	1,801.3	142.5	822.2	1,121.6	12.7	45.6
1990	1,927.8	178.2	831.9	1,274.1	14.0	43.2

Sources: Japan Ministry of International Trade and Industry; Ministry of Finance

GERMANY

NC Imports and Exports by Type of Machine

(continued)

(millions of U.S. dollars)

	IMPORTS				EXPORTS			
	UNITS		VALUE		UNITS		VALUE	
	1989	1990	1989	1990	1989	1990	1988	1990
Grinding machines	604	714	$ 85.8	$133.7	786	961	$211.4	$357.2
Surface	71	53	5.6	9.0	150	252	44.7	88.6
Cylindrical	289	362	46.0	70.3	158	181	61.8	126.2
Tool & cutter	56	96	3.6	4.8	259	281	34.7	40.2
Other	188	203	30.6	49.6	219	247	70.2	102.3
Boring machines	5	3	2.7	0.2	24	9	13.2	2.8
Boring–milling machines	612	681	67.5	93.6	161	152	70.5	57.3
Gear machines	47	57	14.7	26.0	134	210	54.9	112.7
Gear finishing	27	32	13.9	20.4	48	86	20.7	47.3
For cylindrical gears	2	5	0.4	2.8	80	114	33.3	59.6
Other gear cutting	18	20	0.4	2.7	6	10	0.9	5.8
METAL FORMING TOTAL	1,172	1,579	101.4	152.6	1,160	1,106	254.8	347.1
Forging machines	9	6	0.8	6.8	24	31	5.7	27.3
Presses	203	64	13.1	17.2	149	145	42.4	47.5
of which hydraulic	148	46	11.0	7.5	138	135	39.8	40.4
Bending, folding, straightening, etc.	554	781	40.5	60.3	344	263	48.6	52.6
For flat products	359	446	27.1	37.5	145	140	18.2	29.4
For non–flat products	195	335	13.4	22.8	199	123	30.4	23.2
Punching, shearing, notching	406	728	47.0	68.3	643	667	158.1	219.7
Shearing machines*	61	187	2.2	11.3	75	102	16.7	51.2
Shearing machines**	60	136	1.3	3.8	15	16	1.9	3.5
Punching & notching*	211	324	33.3	37.7	533	528	137.2	161.6
Punching & notching**	74	81	10.2	15.4	20	21	2.3	3.3

Source: Verein Deutscher Werkzeugmaschinenfabriken e.V. (VDW)
Note: * for flat products, ** for non–flat products

INDIA

Production

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990p	1986	1987	1988	1989	1990p
MACHINE TOOL TOTAL	11,100	10,382	8,543	7,918	8,970	$180.9	$190.8	$200.0	$210.6	$237.3
EDM, spark erosion	113	113	119	122	236	2.0	2.9	4.3	4.8	7.9
of which NC wire EDM	3	9	30	35	64	0.2	0.7	2.8	3.0	5.4
Special purpose machines	239	178	338	420	336	16.0	15.8	28.0	25.0	24.9
Machining centers	50	73	71	96	105	9.2	18.8	19.7	25.2	23.8
Vertical	na	na	na	44	70	na	na	na	7.6	11.0
Horizontal	na	na	na	52	35	na	na	na	17.5	12.8
Lathes	4,496	4,263	3,241	3,174	3,039	53.3	56.0	66.8	69.1	81.7
of which NC	27	89	124	271	281	3.9	14.4	18.5	30.3	34.6
Boring, boring–milling	66	93	111	199	91	7.6	11.9	10.1	11.9	8.6
of which NC	—	15	28	9	13	—	1.4	2.0	1.8	1.8
Milling machines	1,305	1,392	1,072	1,280	1,484	17.9	17.8	14.1	15.7	25.2
of which NC	6	4	8	17	33	0.3	0.3	0.7	–1.6	3.3
Drilling machines	1,540	1,118	1,188	651	1,297	11.0	7.9	8.5	5.8	7.9
of which NC	2	2	2	10	5	0.1	0.1	0.1	0.7	1.2
Grinding, honing, lapping	1,863	1,718	1,263	1,024	1,324	23.6	21.7	18.5	16.0	20.9
of which NC	—	1	6	6	15	—	0.2	1.8	1.2	3.6
Planing machines	25	17	15	8	5	2.6	1.0	1.0	1.9	1.2
Broaching machines	26	25	20	14	22	0.9	1.1	0.7	0.3	1.0
Slotting machines	56	15	12	1	24	1.4	0.6	0.2	(a)	0.5
Shaping machines	105	55	70	57	3	1.3	0.7	0.6	0.3	(a)
Threading & tapping	73	104	32	45	61	0.9	1.6	0.5	0.6	0.6
Sawing & cut–off machines	240	236	184	116	175	0.5	0.6	0.6	0.3	0.6
Gear cutting/hobbing	60	48	53	63	79	4.6	3.7	3.2	4.0	3.8
Die casting machines	29	37	17	11	9	4.1	5.6	2.3	1.6	1.3
Bend, fold, straighten, etc.	135	129	97	102	117	4.2	2.7	2.0	3.8	3.2
Presses	501	524	432	358	447	15.7	16.2	13.7	19.5	22.3
Punching & shearing	78	162	58	51	46	2.1	2.4	1.8	1.4	1.5
Forging, swaging	23	12	15	18	8	1.8	0.9	1.4	3.2	0.3
Wire working machines	—	4	—	50	7	—	0.1	—	0.3	0.1
Other machine tools	77	66	135	59	55	0.3	0.6	1.7	0.1	(a)

Source: Indian Machine Tool Manufacturers' Association

Note: (p) – preliminary, (a) –less than $50,000, na – not available

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Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
METAL CUTTING TOTAL	$2,157.6	$2,049.0	$2,508.7	$3,106.6	$3,148.0
United States	859.3	673.6	842.4	1,130.2	907.9
South Korea	178.5	268.4	297.0	307.0	424.8
West Germany	184.3	193.0	254.1	309.1	352.6
Belgium	110.2	120.5	108.0	161.4	225.6
Thailand	11.1	30.4	63.7	141.4	133.4
Taiwan	45.9	99.6	128.1	166.4	125.3
United Kingdom	78.6	70.7	106.9	145.5	124.4
Singapore	22.8	42.5	68.4	66.6	80.0
Italy	17.8	29.4	47.4	61.6	76.7
Switzerland	35.7	35.3	47.4	57.8	76.1
Indonesia	12.3	39.8	25.3	38.5	65.8
France	29.9	28.6	69.2	52.5	65.3
Sweden	35.5	33.6	42.1	49.0	52.6
Malaysia	3.5	14.8	16.3	27.5	51.8
Canada	33.8	40.2	43.5	47.2	38.5
Australia	63.5	33.8	46.0	46.1	37.7
China	157.8	62.6	27.8	35.3	37.1
Spain	11.0	17.1	26.9	25.7	29.4
Netherlands	16.4	12.2	16.7	19.1	28.6
Hong Kong	24.0	29.6	36.8	32.2	28.2
Mexico	5.9	4.4	17.2	22.2	22.7
Denmark	19.6	11.5	10.4	16.0	18.5
USSR	39.6	29.9	52.5	12.0	18.3
India	49.9	27.3	19.5	17.6	16.9
Philippines	3.5	4.1	4.5	11.8	10.1
All other countries	107.2	96.1	90.6	106.9	99.8
METAL FORMING TOTAL	905.8	985.8	919.3	822.2	831.9
United States	451.4	422.2	303.9	253.9	176.2
South Korea	53.9	81.4	90.6	104.9	124.4
Thailand	4.0	14.0	51.3	62.4	69.6
Taiwan	27.5	55.8	80.5	52.8	67.1
Malaysia	6.6	14.5	16.3	20.5	61.0
United Kingdom	10.2	43.4	27.2	37.8	38.1
Canada	82.8	28.5	61.2	22.4	35.6
China	104.0	83.8	52.3	37.6	29.3
Singapore	14.0	30.0	27.7	26.3	28.8
West Germany	26.3	18.8	20.2	12.8	25.1
USSR	20.5	57.4	69.6	50.4	22.4
Mexico	6.3	4.8	1.0	3.8	21.4
France	6.5	8.8	18.7	26.4	20.4
Italy	2.9	8.8	10.1	14.4	17.1
Indonesia	6.8	11.5	7.4	11.2	16.6
India	5.6	6.9	9.5	6.1	7.4
All other countries	76.5	94.4	71.7	78.5	71.2

Source: Japan Ministry of Finance

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Metal Cutting Exports by Type of Machine and Destination, 1990

(millions of U.S. dollars)

	U.S.	S. Korea	W. Germ.	Belgium	Thail.	Taiwan	U.K.	Sing.
METAL CUTTING TOTAL								
Units	207,202	11,206	8,850	2,428	16,874	19,990	11,105	13,376
Value	$907.9	$424.8	$352.6	$225.6	$133.4	$125.3	$124.4	$80.0
Physico–chemical machines								
Units	3,378	1,047	1,154	64	143	553	127	256
Value	98.9	51.8	69.3	18.3	7.4	22.3	8.9	13.4
of which EDM								
Units	736	310	908	6	98	100	107	148
Value	59.0	24.5	68.1	0.3	7.2	8.7	7.1	11.9
Machining centers								
Units	1,780	60	691	411	104	173	242	106
Value	255.5	19.9	106.6	106.9	16.4	26.9	42.2	12.1
Transfer & special purpose								
Units	51	75	3	—	5	3	1	6
Value	46.6	70.4	0.5	—	0.9	1.3	0.3	2.5
Lathes								
Units	2,450	366	2,074	637	1,797	393	586	380
Value	263.7	43.0	137.2	99.4	40.7	20.1	47.9	22.5
of which NC horizontal								
Units	2,240	146	1,442	566	308	229	511	283
Value	234.3	16.9	133.8	94.1	22.5	15.5	45.7	19.7
Drilling machines								
Units	559	434	1,073	75	379	414	184	1,118
Value	26.5	22.7	19.0	0.1	6.6	3.7	5.8	9.9
Boring–milling machines								
Units	13	37	1	1	33	12	2	13
Value	2.6	7.2	(a)	(a)	3.1	2.9	0.1	1.1
Boring machines								
Units	36	69	4	—	77	10	2	7
Value	8.4	29.5	0.2	—	5.2	0.8	0.6	0.3
Milling machines								
Units	167	134	37	—	264	90	7	97
Value	18.5	33.0	1.9	—	5.4	5.8	0.5	3.9
Grinding and finishing machines								
Units	3,417	927	265	4	1,358	409	1,105	1,112
Value	124.5	93.9	5.9	0.3	26.4	24.5	13.7	7.4
Threading and tapping machines								
Units	739	2,804	1,805	61	937	2,722	821	436
Value	10.1	3.4	6.9	0.2	9.1	3.4	1.4	1.7
Gear cutting machines								
Units	30	212	—	—	90	66	—	1
Value	5.3	31.4	—	—	2.5	4.1	—	(a)
Sawing and cut–off machines								
Units	194,019	4,910	1,726	1,175	11,429	15,105	8,017	9,739
Value	41.0	8.9	4.8	0.2	5.0	7.3	2.4	2.8
Metal cutting n.e.c.								
Units	563	131	17	—	258	40	11	105
Value	6.3	9.7	0.3	—	4.9	2.3	0.6	2.2

(continued)

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Production

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	147,637	198,988	209,685	229,593	$6,382.6	$8,668.9	$10,058.8	$10,929.1
METAL CUTTING TOTAL	125,536	169,326	177,972	196,125	4,762.0	6,875.3	8,257.5	9,001.3
of which NC	35,460	47,650	58,042	61,965	3,364.7	4,842.9	6,029.1	6,812.3
Lathes	21,066	28,257	32,748	32,659	1,230.9	1,771.6	2,039.1	2,192.2
NC	15,241	20,942	24,491	25,406	1,079.3	1,585.6	1,824.2	1,994.3
Horizontal	618	733	830	953	76.1	93.3	1,703.3	154.5
Vertical	14,623	20,209	23,661	24,453	1,003.2	1,492.4	120.9	1,839.8
Center lathes	2,224	3,110	3,644	3,519	52.8	73.8	97.1	95.7
Automatic	2,515	2,536	2,522	1,899	82.3	82.0	90.4	74.7
Other lathes	1,086	1,669	2,091	1,835	16.5	20.7	27.4	27.4
Drilling machines	23,206	31,731	37,705	38,670	101.3	175.1	210.3	240.1
NC	1,597	2,438	3,045	3,639	63.2	120.7	146.3	171.5
Radial	225	241	205	214	5.2	7.1	7.0	8.2
Multi–spindle	359	370	441	389	11.6	13.9	15.6	16.6
Bench–type	19,125	26,546	31,344	31,777	10.9	19.4	24.7	26.1
Other	1,900	2,136	2,670	2,651	10.3	14.0	16.6	17.7
Boring machines	871	1,223	1,447	1,501	95.8	151.8	193.6	204.1
NC	168	195	445	451	53.7	75.2	137.3	146.5
Horizontal	97	188	68	56	20.3	44.2	19.9	19.1
Jig boring	374	548	599	649	16.2	24.5	24.8	26.8
Other	232	292	335	345	5.5	8.0	11.6	11.7
Milling machines	4,859	6,959	8,612	8,492	258.1	379.2	477.5	469.1
NC	1,811	2,319	2,933	2,949	172.5	235.5	304.4	300.1
Bed–type	596	1,109	1,485	1,489	22.6	46.9	58.0	58.0
Knee–type	1,813	2,792	3,384	3,201	43.3	74.4	87.5	83.4
Profile	425	402	445	529	11.8	11.5	16.4	15.9
Other	214	337	365	324	7.9	10.9	11.2	11.7

(continued)

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
Grinding machines	8,631	11,667	12,740	13,417	$ 559.8	$ 853.0	$1,035.6	$1,108.5
NC	939	1,447	1,929	2,428	131.6	221.9	353.5	434.4
External cylindrical	1,089	1,540	1,731	1,716	89.1	131.5	147.6	143.0
Internal cylindrical	419	503	460	346	38.1	62.0	49.7	32.4
Surface grinders	3,487	4,336	3,925	4,136	127.3	203.4	185.7	207.4
Centerless	606	796	954	948	52.5	87.8	118.6	117.0
Honing or lapping	340	381	419	362	16.7	27.9	27.0	31.3
Tool or cutter	973	1,316	1,661	1,833	32.0	26.2	34.1	35.3
Other	778	1,348	1,661	1,648	72.5	92.3	119.4	108.0
Gear cutting or finishing	746	1,001	1,080	1,172	88.5	129.7	157.1	171.5
Gear hobbing	349	542	493	541	38.4	58.7	67.7	77.8
Other gear cutting	119	141	180	189	18.5	25.3	32.9	36.6
Gear finishing	278	318	407	442	31.6	45.6	56.5	57.2
Transfer & special purpose	3,476	5,074	5,138	5,654	570.6	808.2	954.9	1,106.1
NC	1,140	1,640	1,640	2,087	198.8	283.7	335.0	539.9
Other	2,336	3,434	3,498	3,567	371.7	524.5	619.9	566.2
Machining centers	9,027	11,474	14,828	15,820	1,160.3	1,613.8	2,074.5	2,315.2
Vertical	5,869	7,712	3,416	10,092	547.8	770.5	801.8	963.7
Y-axis < 500mm	4,031	5,628	9,861	7,096	298.7	470.9	940.7	560.0
Y-axis > 500mm	1,838	2,084	1,551	2,996	249.1	299.6	332.0	403.7
Horizontal	2,345	2,692	3,416	4,066	462.2	609.2	801.8	935.7
Table size < 500mm	894	959	1,369	1,575	115.2	147.4	235.0	257.3
Table size > 500mm	1,451	1,733	2,047	2,491	347.0	461.8	566.8	678.4
Other	812	1,060	1,551	1,662	150.0	227.2	332.0	415.8
EDM	5,064	6,140	6,923	6,939	453.2	589.4	634.1	642.0
NC	4,744	5,819	6,515	6,655	433.7	561.4	604.7	619.9
Die sinking	1,597	1,724	1,946	2,090	149.2	163.0	183.7	203.4
Wire type	3,147	4,095	4,569	4,565	284.5	398.4	421.0	416.5
Other EDM	320	321	408	284	19.5	28.0	29.4	22.2

(continued)

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(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
Metal cutting n.e.c.	48,590	65,800	56,751	71,801	$ 243.7	$ 403.6	$ 480.7	$ 552.1
NC	793	1,376	2,216	2,530	71.4	145.1	249.0	290.6
Planing, shaping	250	227	291	276	14.2	17.4	22.7	24.0
Sawing or cut-off	5,362	6,116	7,113	7,446	39.5	64.8	74.6	75.7
Threading & tapping	41,062	56,564	46,000	60,246	42.1	69.4	65.7	71.9
Other n.e.c.	1,123	1,517	1,131	1,303	76.5	106.9	68.7	89.8
METAL FORMING TOTAL	22,101	29,662	31,713	33,468	1,620.6	1,793.6	1,801.3	1,927.8
Bending machines	866	959	1,010	811	48.1	54.4	65.2	58.9
Presses	15,395	20,449	21,573	22,503	1,353.8	1,396.4	1,350.5	1,457.8
Hydraulic	5,685	7,212	7,902	7,790	187.4	264.4	298.5	314.8
NC	(b)	1,424	1,928	na	(b)	39.4	84.2	na
Non-NC	5,685	7,212	7,902	na	187.4	264.4	298.5	na
< 100 tons	4,656	5,828	6,395	na	69.0	104.4	113.9	na
100-500 tons	958	1,299	1,414	na	71.4	108.3	129.8	na
> 500 tons	71	85	93	na	47.0	51.7	54.7	na
Mechanical	9,710	13,237	13,672	14,713	1,166.3	1,132.0	1,052.0	1,143.0
NC	(b)	1,589	1,928	na	(b)	270.0	285.2	na
NC punching machines	(b)	1,507	1,843	na	(b)	125.2	165.2	na
Other	(b)	82	85	na	(b)	144.8	120.0	na
Non-NC	9,710	13,237	13,672	na	1,166.3	1,132.0	1,052.0	na
< 100 tons	7,172	10,365	10,736	na	231.4	362.7	335.8	na
100-500 tons	2,246	2,662	2,725	na	239.1	288.8	329.6	na
> 500 tons	292	210	211	na	695.8	480.5	386.6	na
Shearing machines	4,344	5,829	6,611	7,465	105.6	153.7	178.2	192.9
Forging & stamping	606	748	774	687	56.1	77.8	76.1	79.5
Wire forming machines	890	1,677	1,745	2,002	57.1	111.2	131.3	138.7

Sources: Japan Machine Tool Builders' Association and Japan Forming Machinery Association
Note: (b) – not available, included in non-NC , n.e.c – not elsewhere classified, na – not available

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	407,817	397,648	390,176	453,076	$3,034.8	$3,428.0	$3,929.7	$3,979.8
METAL CUTTING TOTAL	373,969	371,411	360,057	421,698	2,049.0	2,508.7	3,106.6	3,148.0
of which NC	13,404	19,239	21,845	20,145	1,420.5	1,998.7	2,524.3	2,569.3
Physico–chemical machines	2,118	6,006	6,718	7,748	171.4	275.9	306.5	335.9
Laser	na	140	232	386	na	26.8	50.0	76.3
Ultrasonic	na	759	803	759	na	3.1	2.3	12.9
EDM	na	2,743	2,923	2,856	na	231.9	237.4	217.8
NC wire	na	2,124	2,163	2,086	na	184.2	189.3	173.9
NC die sinking	na	400	555	397	na	37.5	43.3	38.6
Other EDM	na	219	205	373	na	10.2	4.8	5.4
Other	na	2,364	2,760	3,747	na	14.1	16.7	28.9
Machining centers	4,173	4,351	5,253	4,920	570.9	647.2	812.3	811.4
Vertical	na	2,742	3,416	3,413	na	290.0	392.7	415.2
Horizontal	na	1,258	1,434	1,468	na	294.9	345.6	383.9
Other	na	351	403	39	na	62.3	74.0	12.3
Way type unit heads	(b)	82	103	42	(b)	0.1	2.6	0.3
Transfer & special purpose	(b)	99	193	163	(b)	59.9	135.4	129.8
of which NC	(b)	28	133	108	(b)	33.6	96.5	105.7
Lathes	10,149	11,889	13,148	12,786	627.3	781.7	940.8	948.6
NC lathes	7,047	8,186	9,266	8,674	587.1	730.3	870.3	895.9
of which horizontal	na	7,891	9,008	8,281	na	683.6	834.9	825.9
Non–NC lathes	3,102	3,703	3,882	4,112	40.3	51.3	70.5	52.7
Center	597	1,475	1,358	1,504	7.1	11.0	14.0	9.9
Automatic	1,339	1,014	1,445	1,183	22.5	27.8	43.4	33.0
Other horizontal	(c)	716	657	1,105	(c)	5.0	2.5	2.8
Other non–NC lathes	1,166	498	422	320	10.6	7.6	10.7	7.0
Drilling machines	7,720	7,334	7,030	7,002	93.9	94.2	126.3	126.4
NC	1,117	1,189	1,566	1,474	60.0	65.2	94.1	95.8
Non–NC	6,603	6,145	5,464	5,528	33.9	29.1	32.2	30.6
Multi–spindle	251	801	307	251	14.2	19.1	15.6	15.1
Radial	66	121	110	174	1.8	2.1	1.8	2.6
Other	6,286	5,223	5,047	5,103	17.9	7.9	14.7	12.9

(continued)

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Exports by Type of Machine

(continued)

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
Boring machines	478	339	307	277	$ 68.2	$ 34.3	$ 33.0	$ 51.2
of which NC	129	48	73	69	42.4	17.8	19.0	30.1
Boring–milling machines	na	176	222	144	na	35.5	41.1	22.6
of which NC	na	77	107	58	na	27.2	32.7	18.2
Milling machines	3,102	2,306	1,719	1,172	124.0	91.6	99.1	90.0
NC	474	328	279	275	90.6	59.7	67.7	61.1
Knee type	na	61	42	33	na	5.8	3.8	2.6
Other	na	267	237	242	na	53.9	63.8	58.4
Non–NC	2,628	1,978	1,440	897	33.4	31.9	31.4	28.9
Profile	262	50	115	53	3.0	1.9	1.4	1.7
Knee type	368	380	336	331	9.0	9.1	6.2	6.7
Other	1,998	1,548	989	513	21.3	20.9	23.8	20.5
Planing machines	35	58	51	53	1.1	4.7	7.9	5.4
of which NC	na	3	6	7	na	2.3	4.5	4.3
Grinding machines	15,636	13,017	13,857	12,789	234.3	310.3	398.7	390.3
NC	464	805	890	948	69.5	124.3	188.7	191.2
Surface	na	87	111	108	na	14.4	18.4	20.0
Other precision	na	368	599	637	na	70.5	142.8	133.6
Tool or cutter	na	48	28	46	na	4.7	2.7	5.4
Honing or lapping	na	187	64	56	na	12.5	9.6	7.5
Other finishing	na	115	88	101	na	22.3	15.3	24.8
Non–NC	15,172	12,212	12,967	11,841	164.9	186.0	210.0	199.1
Surface	962	711	670	714	23.3	21.5	23.4	30.7
External cylind.	232	207	187	191	19.6	23.4	15.4	17.2
Internal cylind.	92	101	115	104	7.7	11.0	15.0	11.1
Centerless	183	182	212	200	18.9	20.2	30.1	26.4
Tool or cutter	141	4,099	4,864	4,197	2.3	12.1	15.3	15.8
Honing or lapping	(d)	298	410	370	(d)	13.6	26.2	18.3
Other finishing	(d)	6,198	6,162	5,487	(d)	53.6	63.6	56.1
Grinding n.e.c.	13,562	416	347	578	93.1	30.4	21.0	23.6

(continued)

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
Gear cutting machines	436	474	474	504	$ 44.0	$ 36.8	$ 33.9	$ 49.1
NC	(e)	161	130	185	(e)	26.4	23.7	35.1
Non–NC	436	313	344	319	44.0	10.4	10.2	14.0
Gear hobbing	219	182	211	199	18.1	5.4	5.3	9.4
Other gear cutting	217	79	75	63	25.9	3.3	1.8	2.2
Gear finishing	(f)	52	58	57	(f)	1.7	3.1	2.4
Sawing or cut–off	321,460	313,263	297,641	357,244	64.4	89.1	100.9	111.8
Threading or tapping	7,466	8,445	10,466	15,322	15.9	26.2	39.3	48.9
of which NC	na	257	443	484	na	11.8	21.8	28.2
Shaping or slotting	(b)	1,401	270	294	(b)	4.1	3.1	3.9
Broaching machines	(b)	38	66	60	(b)	4.4	9.2	9.3
Metal cutting n.e.c.	1,196	2,133	2,539	1,178	33.6	12.7	16.5	10.2
METAL FORMING TOTAL	33,848	26,237	30,119	31,378	985.8	919.3	822.2	831.9
Forging or die–stamping	299	510	720	512	35.7	55.2	54.4	49.0
Bend., fold., str., etc.	2,030	2,491	2,821	3,057	65.7	72.2	88.7	83.0
of which NC	na	248	301	256	na	25.9	31.7	30.0
Punching & shearing	8,556	8,460	9,220	10,874	110.6	195.5	174.8	199.3
Shearing machines*	na	6,200	7,254	8,692	na	40.5	37.5	46.8
of which NC	na	67	35	68	na	10.6	5.1	15.0
Punching or notching**	na	2,260	1,966	2,182	na	155.0	137.3	152.5
of which NC	na	866	1,089	1,068	na	101.3	113.2	127.7
Presses	6,673	10,084	11,912	11,648	656.1	500.0	409.6	382.9
Hydraulic	1,633	2,066	2,340	2,381	78.1	78.7	82.6	90.7
Other	5,040	8,018	9,572	9,267	578.0	421.3	327.0	292.2
Draw benches	209	457	331	507	9.2	23.0	19.0	26.0
Thread rolling machines	(g)	567	376	280	(g)	6.9	8.0	6.7
Machines for working wire	(g)	803	682	906	(g)	27.9	28.2	32.6
Metal forming n.e.c.	16,081	2,865	4,057	3,594	108.5	38.6	39.6	52.2

Source: Japan Ministry of Finance

Note: na – not available , n.e.c. – not elsewhere classified , (b) – included in "metal cutting n.e.c.," (c) – included in "other non–NC lathes," (d) – included in "grinding machines n.e.c.," (e) – included in "non–NC gear cutting & finishing," (f) – included in "other gear cutting," (g) – included in "metal forming n.e.c.," * – excludes combination punching & shearing machines ** – includes combination punching & shearing machines

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Metal Cutting Exports by Type of Machine and Destination, 1990
(continued)

(millions of U.S. dollars)

	Italy	Switz.	Indon.	France	Sweden	Malaysia	Canada	China
METAL CUTTING TOTAL								
Units	5,565	1,153	5,371	6,039	1,549	5,793	25,536	4,269
Value	$76.7	$76.1	$65.8	$65.3	$52.6	$51.8	$38.5	$37.1
Physico–chemical machines								
Units	146	14	9	92	33	64	11	59
Value	8.8	0.3	0.5	4.1	2.8	6.1	0.9	2.4
of which EDM								
Units	56	13	2	65	28	25	8	12
Value	4.1	0.3	0.2	4.1	1.6	2.2	0.7	1.0
Machining centers								
Units	164	130	88	196	97	52	97	11
Value	26.9	19.8	15.4	30.6	19.6	6.5	15.8	3.0
Transfer & special purpose								
Units	4	—	1	—	—	4	—	5
Value	0.1	—	(a)	—	—	1.0	—	1.5
Lathes								
Units	337	646	155	251	179	235	119	278
Value	30.4	53.7	12.9	19.2	25.4	10.3	10.9	5.7
of which NC horizontal								
Units	320	623	70	229	177	98	111	15
Value	27.9	53.4	7.6	18.9	25.0	6.4	10.4	1.8
Drilling machines								
Units	316	38	227	86	154	129	—	98
Value	3.2	0.8	8.2	2.6	1.4	1.5	—	3.0
Boring–milling machines								
Units	—	—	3	—	1	9	4	6
Value	—	—	0.2	—	0.2	0.4	1.5	0.1
Boring machines								
Units	1	—	35	—	—	1	—	6
Value	(a)	—	4.9	—	—	(a)	—	0.2
Milling machines								
Units	17	—	50	3	9	44	4	61
Value	1.5	—	4.2	0.5	0.3	1.6	1.7	2.7
Grinding and finishing machines								
Units	16	106	596	85	14	980	202	316
Value	2.5	1.1	12.9	4.5	2.1	16.3	2.8	14.4
Threading and tapping machines								
Units	360	75	305	45	30	734	6	38
Value	0.5	0.2	3.0	0.3	0.3	1.6	0.1	0.6
Gear cutting machines								
Units	4	—	2	—	—	4	—	11
Value	0.3	—	(a)	—	—	0.6	—	0.4
Sawing and cut–off machines								
Units	4,192	144	3,872	5,279	1,027	3,495	25,093	3,342
Value	2.5	0.2	2.1	3.3	0.5	4.9	4.8	2.3
Metal cutting n.e.c.								
Units	8	—	28	2	5	42	—	38
Value	(a)	—	1.4	(a)	(a)	1.0	—	0.9

Source: Japan Machine Tool Builders' Association (JMTBA)

Note: a = less than $50,000, n.e.c. – not elsewhere classified

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	47,564	96,806	115,475	100,937	$264.3	$397.1	$508.5	$652.0
METAL CUTTING TOTAL	42,429	92,592	110,364	96,209	152.6	286.6	366.0	474.1
of which NC	551	855	882	1,152	70.7	112.6	139.6	202.9
Physico–chemical mach.	190	1,168	1,443	1,530	9.1	96.5	124.2	121.8
Laser	na	155	172	250	na	17.3	25.8	32.6
Ultrasonic	na	29	61	61	na	0.4	0.5	0.8
EDM	na	503	457	379	na	18.2	22.3	17.2
NC wire	na	60	54	103	na	8.4	7.0	9.6
NC die sinking	na	109	77	42	na	6.4	8.6	4.0
Other EDM	na	334	326	234	na	3.4	6.7	3.6
Other	na	481	753	840	na	60.7	75.5	71.2
Machining centers	(b)	80	103	164	(b)	5.2	10.4	12.8
Horizontal	(b)	19	34	40	(b)	1.3	2.8	4.1
Other	(b)	61	69	124	(b)	3.9	7.6	8.7
Transfer & special purpose	(b)	12	17	34	(b)	4.3	3.9	16.6
Lathes	1,419	1,873	3,113	2,665	17.1	26.9	33.5	38.5
NC lathes	49	141	74	83	6.5	12.0	6.9	8.5
Horizontal	na	107	58	67	na	6.3	4.8	6.9
Other	na	34	16	16	na	5.7	2.1	1.6
Non–NC lathes	1,370	1,732	3,039	2,582	10.6	14.8	26.6	30.0
Center	1,094	1,258	2,203	2,011	6.3	9.2	17.1	17.5
Automatic	87	174	181	129	2.6	4.2	6.5	7.7
Autocycle copying	0	1	95	28	—	(a)	0.6	0.2
Other horizontal	(c)	202	283	309	(c)	0.4	0.7	0.6
Other non–NC lathes	189	97	277	105	1.6	1.1	1.8	4.0
Drilling machines	14,753	24,543	32,865	24,865	6.4	5.1	9.1	13.2
of which NC	136	10	87	81	2.8	1.7	2.6	2.7
Boring machines	38	34	24	49	3.0	4.7	2.0	6.2
of which NC	3	7	3	5	1.1	2.5	0.5	2.3
Boring–milling machines	na	43	117	90	na	5.2	6.0	5.3
of which NC	na	16	31	14	na	3.3	3.0	2.9
Milling machines	1,325	1,308	1,552	1,639	14.6	6.3	9.8	13.8
NC milling machines	49	76	56	54	10.1	2.0	3.1	5.7
of which knee type	na	39	27	24	na	0.6	0.3	0.2
Non–NC	1,276	1,232	1,496	1,585	4.5	4.4	6.7	8.1
Universal or profile	800	236	105	13	1.4	0.8	0.4	0.1
Knee type	142	151	412	352	1.2	1.1	3.4	2.3
Other	334	845	979	1,220	1.9	2.5	2.9	5.7
Planing machines	4	5	1	9	0.5	0.4	0.1	1.2

(continued)

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Imports by Type of Machine
(continued)

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
Grinding or finishing	20,709	60,125	62,288	48,413	$ 71.3	$ 80.0	$ 98.6	$142.6
NC	113	156	178	283	29.5	33.2	45.4	72.9
Surface	na	26	36	107	na	2.7	4.8	13.0
Other precision grind.	na	61	80	96	na	22.1	27.6	42.4
Tool or cutter	na	24	28	43	na	6.0	5.9	10.1
Other finishing mach.	na	45	34	37	na	2.4	7.1	7.3
Non–NC	20,596	59,969	62,110	48,130	41.7	46.9	53.2	69.7
Surface	946	830	911	939	12.7	10.6	14.6	17.6
External cylindrical	60	66	93	115	7.2	7.7	8.1	11.2
Internal cylindrical	23	19	31	13	1.7	1.4	2.9	2.2
Thread grinding	20	9	9	8	0.6	1.1	0.6	1.8
Tool or cutter	(d)	17,421	20,607	28,374	(d)	5.7	7.7	11.9
Honing or lapping	(d)	514	115	64	(d)	4.5	3.8	7.7
Other finishing	(d)	27,044	14,703	1,268	(d)	4.0	3.0	2.9
Grinding n.e.c.	19,547	14,066	25,641	17,349	19.5	11.9	12.4	14.3
Gear cutting machines	119	201	199	206	16.5	33.4	41.6	67.5
NC	12	45	47	73	6.4	20.7	26.1	48.8
Non–NC	107	156	152	133	10.1	12.7	15.4	18.7
Gear hobbing	52	107	58	46	1.2	3.2	2.4	2.7
Other gear cutting	55	19	38	47	8.9	3.6	5.0	9.3
Gear finishing	(e)	30	56	40	(e)	5.8	8.1	6.8
Sawing or cut–off	1,525	2,432	7,291	15,256	2.5	7.3	13.5	17.1
Threading or tapping	17	66	145	177	(a)	0.5	1.3	1.1
Shaping or slotting	(b)	15	37	24	(b)	0.3	0.1	0.3
Broaching machines	3	2	1	3	0.2	0.6	0.8	(a)
Metal cutting n.e.c.	2,275	685	1,168	1,085	5.3	10.0	11.1	16.1
METAL FORMING TOTAL	5,135	4,214	5,111	4,728	111.7	110.5	142.5	178.2
Forging or die–stamping	89	74	314	149	28.8	16.3	29.3	42.4
Bend., fold., str., etc.	335	738	1,137	1,274	16.1	17.2	25.3	24.0
of which NC	26	24	44	62	8.6	6.8	11.7	14.9
Punching & shearing mach.	303	604	1,086	933	9.9	22.2	24.8	28.9
NC shearing*	2	4	7	55	0.1	0.4	1.2	3.1
Non–NC shearing*	(f)	429	846	597	(f)	2.3	4.8	10.7
NC punch. or notch.**	26	38	54	40	6.6	8.8	12.6	9.3
Non–NC punch. or notch.**	275	133	179	241	4.4	10.6	6.2	5.7
Presses	495	786	1,551	883	27.6	29.1	25.6	27.4
of which hydraulic	102	114	190	178	6.1	3.5	10.5	10.8
Draw benches	5	21	51	26	0.7	1.5	3.8	7.1
Thread rolling machines	(g)	24	47	15	(g)	1.3	2.3	0.8
Mach. for forming springs	26	23	24	38	2.6	1.9	2.0	4.5
Mach. for working wire	(g)	236	183	251	(g)	8.3	6.0	13.8
Metal forming n.e.c.	3,882	1,708	718	1,197	26.5	12.7	23.6	29.3

Source: Japan Ministry of Finance

Note: na – not available, n.e.c. – not elsewhere classified, (a) – less than $50,000, (b) – included in "metal cutting n.e.c." (c) – included in "other non–NC lathes," (d) – included in "grinding machines n.e.c.," (e) – included in "other gear cutting," (f) – included in "non–NC punching or notching," (g) – included in "metal forming n.e.c.," * – excludes combination punching & shearing machines, ** – includes combination punching & shearing machines

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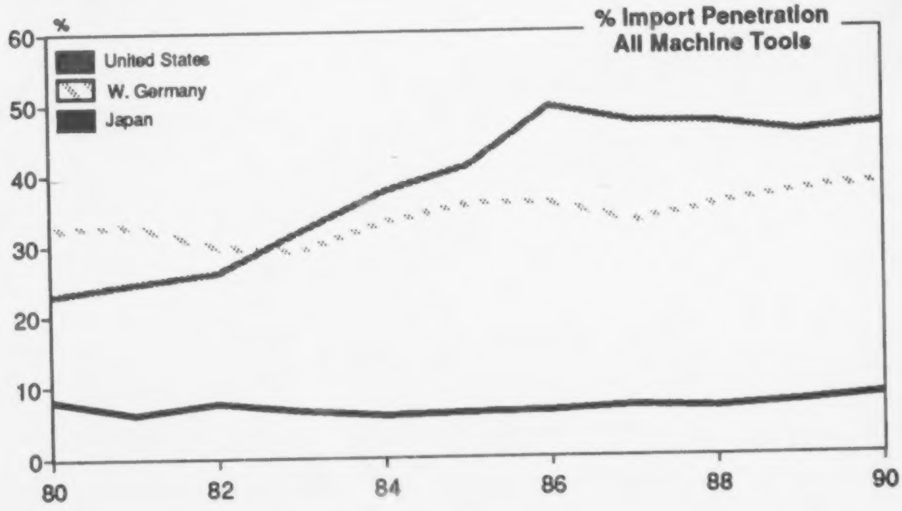
Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
METAL CUTTING TOTAL	$197.3	$152.6	$286.6	$366.0	$474.1
United States	31.6	29.3	106.2	141.2	143.5
West Germany	68.6	42.7	56.3	65.9	121.7
Switzerland	51.7	36.3	58.3	64.4	93.1
Taiwan	9.0	10.3	18.1	35.6	37.0
Singapore	6.2	7.5	9.3	11.8	17.0
South Korea	3.9	3.4	7.7	12.0	13.7
United Kingdom	3.8	2.9	4.9	5.0	10.9
East Germany	3.6	2.9	4.2	5.3	5.2
USSR	4.9	4.4	5.2	2.6	4.4
China	3.0	1.2	1.9	4.2	4.2
Italy	3.6	3.2	4.2	3.7	3.8
France	1.4	0.7	3.2	2.4	2.7
All other countries	6.0	7.8	7.1	11.9	16.9
METAL FORMING TOTAL	75.0	111.7	110.5	142.5	178.2
West Germany	24.8	33.2	20.5	43.5	62.5
United States	25.0	32.8	47.7	43.7	38.4
Switzerland	11.7	11.4	20.5	18.9	29.0
Italy	3.5	6.5	7.9	16.3	22.0
United Kingdom	0.3	2.1	2.5	4.0	4.7
Taiwan	0.9	0.7	1.6	4.0	3.5
USSR	0.5	1.8	1.6	1.7	3.1
South Korea	0.2	0.6	1.5	1.1	1.8
Sweden	1.2	0.3	1.7	3.1	1.7
France	1.0	1.3	0.7	0.1	0.6
All other countries	6.0	21.2	4.2	6.1	10.9

Source: Japan Ministry of Finance


% Import Penetration All Machine Tools

Metal Cutting Imports by Type of Machine and Country of Origin, 1990

(millions of U.S. dollars)

	U.S.	W.Germ.	Switz.	Taiwan	U.K.	Sing.	S. Korea	TOTAL
METAL CUTTING TOTAL								
Units	4,600	1,167	742	81,615	317	1,032	1,228	96,209
Value	$143.5	$121.7	$93.1	$37.0	$10.9	$17.0	$13.7	$474.1
Physico-chemical								
Units	860	36	99	197	22	1	5	1,530
Value	98.4	5.4	10.7	2.0	1.4	(a)	0.1	121.8
of which EDM								
Units	26	8	94	193	8	—	5	379
Value	1.1	1.1	10.6	2.0	0.4	—	0.1	17.2
Machining centers								
Units	2	5	1	43	4	63	38	164
Value	0.3	3.2	1.7	1.9	0.6	2.6	2.1	12.8
Transfer & special purpose								
Units	—	5	27	—	—	—	—	34
Value	—	11.4	4.9	—	—	—	—	16.6
Lathes								
Units	65	71	48	1,487	116	—	201	2,665
Value	1.0	14.2	3.3	10.8	1.3	—	2.2	38.5
Drilling machines								
Units	86	14	7	24,347	—	—	90	24,865
Value	0.6	1.4	1.2	5.8	—	—	2.0	13.2
Boring–milling machines								
Units	5	6	2	63	—	—	—	90
Value	(a)	0.7	1.5	1.5	—	—	—	5.3
Boring machines								
Units	8	—	9	5	—	—	—	49
Value	0.3	—	3.8	(a)	—	—	—	6.2
Milling machines								
Units	33	74	11	1,196	4	20	208	1,639
Value	0.3	1.4	3.0	4.1	0.9	0.1	1.3	13.8
Grinding and finishing machines								
Units	1,657	495	318	41,510	153	948	295	48,413
Value	15.4	53.3	34.0	5.3	6.2	14.2	5.1	142.6
Threading and tapping machines								
Units	140	2	2	22	3	—	—	177
Value	0.3	(a)	0.4	0.1	(a)	—	—	1.1
Gear cutting machines								
Units	60	29	70	3	—	—	10	206
Value	18.0	16.6	27.2	0.1	—	—	0.5	67.5
Sawing and cut-off machines								
Units	1,597	400	62	12,723	10	—	379	15,256
Value	2.9	7.3	0.4	(a)	(a)	—	0.3	17.1
Metal Cutting n.e.c.								
Units	87	30	86	19	5	—	2	1,121
Value	6.0	6.8	1.0	5.3	0.5	—	0.1	17.6

Source: Japan Machine Tool Builders' Association

Note: (a) – less than $50,000

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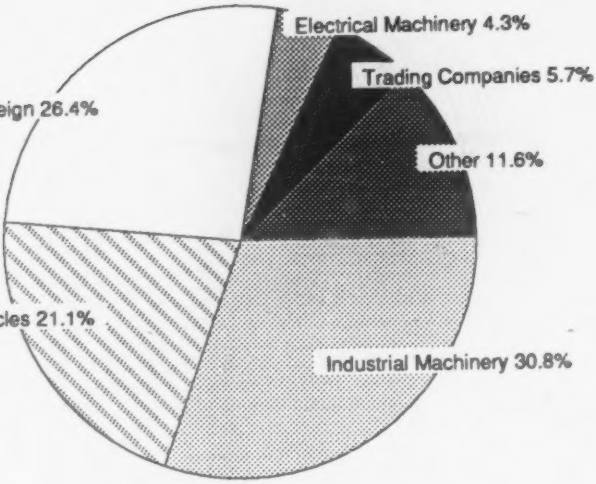
Metal Cutting Orders by User Industry



1990

(millions of U.S. dollars)

User Industry	1986	1987	1988	1989	1990
TOTAL	$4,564.8	$4,809.8	$7,749.5	$9,203.3	$9,752.7
of which NC	3,485.5	3,698.8	6,078.4	7,560.7	8,106.9
Primary metals	24.8	49.8	59.3	81.4	100.1
Fabricated metal products	91.8	141.4	160.2	232.0	245.2
Industrial machinery	1,169.7	1,232.5	2,375.6	2,889.5	3,007.8
Electrical machinery	145.5	178.4	316.6	366.6	422.7
Motor vehicles	775.2	888.4	1,391.9	1,873.7	2,060.2
Shipbuilding/transp. equip.	53.2	53.0	113.7	129.6	115.3
Precision instruments	156.4	203.1	306.0	272.8	250.7
Other machinery & equip.	71.4	102.9	216.5	281.9	300.4
Govt., publ. agencies, schools	14.8	22.9	39.1	26.5	25.6
Other domestic end users	32.5	20.5	56.3	93.6	89.1
Trading companies	386.7	394.4	518.3	507.6	556.7
Foreign orders	1,642.8	1,522.7	2,196.0	2,448.0	2,578.2
Backlog	1,698.6	1,974.0	3,154.8	3,803.2	4,231.6
of which NC	1,375.8	1,328.3	2,183.2	2,859.2	3,114.2

Source: Japan Machine Tool Builders' Association

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MALAYSIA

Imports by Type of Machine

(thousands of U.S. dollars)

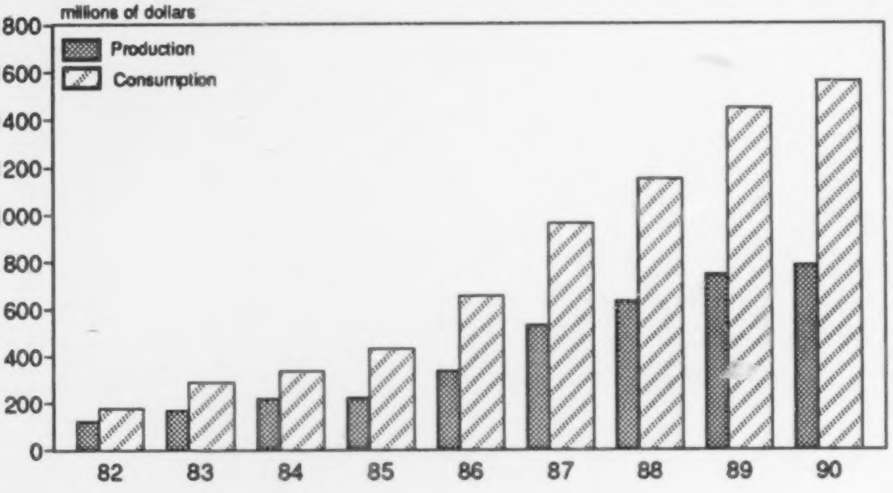
	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	13,362	26,660	123,789	na	$53,632	$73,236	$147,421	$299,007
METAL CUTTING TOTAL	na	15,741	101,954	na	na	36,243	77,939	150,787
Physico–chemical machines	45	296	1,010	na	342	2,195	5,179	16,526
Laser or photon beam	na	1	7	na	na	4	172	564
Ultrasonic	na	29	58	na	na	96	204	1,506
EDM	na	66	127	na	na	955	1,590	5,228
Other	na	200	818	na	na	1,140	3,214	9,228
Machining centers	(c)	7	36	na	(c)	551	2,498	5,536
Transfer machines	(c)	5	23	na	(c)	17	265	4,175
Lathes	529	743	2,463	na	5,070	7,994	17,381	31,894
NC horizontal	na	56	89	na	na	608	1,320	3,847
Other NC	na	28	40	na	na	1,365	1,445	1,910
Non–NC horizontal	na	5	651	na	na	21	4,027	5,698
Other non–NC	na	654	1,683	na	na	6,000	10,590	20,439
Way type unit heads	(c)	9	117	na	(c)	5	287	1,556
Drilling machines	1,358	3,855	6,563	na	1,816	2,011	3,762	7,025
of which NC	na	25	27	na	na	352	253	734
Boring & boring–milling	(c)	128	172	na	(c)	1,351	2,203	3,859
NC boring–milling	(c)	1	6	na	(c)	96	63	688
Non–NC boring–milling	(c)	36	35	na	(c)	258	1,088	1,703
Other boring machines	(c)	91	131	na	(c)	997	1,052	1,468
Milling machines	327	1,065	1,463	na	2,360	3,848	7,953	12,244
NC knee type	na	29	63	na	na	123	394	772
Non–NC knee type	na	52	484	na	na	470	2,812	2,239
Other NC	na	16	21	na	na	330	163	893
Other non–NC	na	968	895	na	na	2,925	4,584	8,340
Threading or tapping	247	381	2,826	na	585	1,177	5,109	5,173
Grinding & finishing	2,309	2,471	5,153	na	11,569	9,125	13,076	23,700
NC flat surface	na	26	24	na	na	1,034	569	1,920
Non–NC flat surface	na	412	555	na	na	905	2,487	2,650
Other NC, acc. > 0.01mm	na	39	23	na	na	1,743	165	2,681
Other non–NC, acc. > 0.01mm	na	425	2,188	na	na	1,593	3,756	8,014
NC sharpening	na	8	6	na	na	10	16	180
Non–NC sharpening	na	252	451	na	na	613	1,702	2,382
Honing or lapping	na	47	145	na	na	788	1,234	1,022
Tool or cutter	na	1,262	1,761	na	na	2,439	3,148	4,851
Shaping or slotting mach.	(c)	207	480	na	(c)	353	1,431	1,561
Broaching machines	(c)	7	6	na	(c)	22	71	649
Gear cutting machines	73	194	631	na	375	925	1,113	1,145
Sawing or cut–off	2,303	2,881	5,599	na	1,298	1,810	6,314	19,408
Planing machines	33	159	28	na	39	166	153	598
Metal cutting n.e.c.	(c)	2,590	72,921	na	(c)	4,695	11,142	15,737
METAL FORMING TOTAL	na	10,919	21,835	na	na	36,993	69,483	148,220
Forging, die stamping	142	790	598	na	827	2,039	5,124	14,497
Bend., form., str., etc.	1,734	2,739	4,871	na	2,872	5,401	9,164	25,331
of which NC	na	2	47	na	na	1	477	7,143
Punching & shearing mach.	389	1,279	6,015	na	3,025	7,258	11,772	29,500
NC shearing*	na	19	23	na	na	64	1,793	2,713
Non–NC shearing*	na	342	1,747	na	na	2,106	2,534	7,801
NC punching or notching**	na	10	31	na	na	564	1,695	1,536
Non–NC punch. or notch.**	na	908	4,214	na	na	4,525	5,750	17,450
Presses	810	4,795	6,455	na	8,018	13,929	29,644	49,850
Hydraulic	na	272	601	na	na	2,093	9,420	15,685
Other	na	4,523	5,854	na	na	11,836	20,224	34,165
Draw benches	(c)	88	26	na	(c)	275	753	1,386
Thread rolling machines	(c)	18	104	na	(c)	101	342	1,405
Machines for working wire	(c)	145	2,001	na	(c)	4,376	5,740	12,439
Metal forming n.e.c.	3,063	1,065	1,765	na	15,436	3,613	6,944	13,812
Tool holders, dieheads	na	na	na	na	na	455	539	1,309
Work holders	na	na	na	na	na	1,006	2,049	4,182
Dividing heads, other attach.	na	na	na	na	na	745	1,849	2,389
Other parts & accessories	na	na	na	na	na	11,340	19,765	23,746

Source: Jabatan Perangkaan, Department of Statistics

Note: na – not available, n.e.c. – not elsewhere classified, (c) – included in "metal forming n.e.c.," * – does not include combined punching and shearing machines, ** – includes combined punching and shearing machines

SOUTH KOREA

Industry Overview



(millions of U.S. dollars)

	Production	Exports	Imports	Consumption	% Import Penetration	Exports as % of Prod.
1982	$124.8	$35.8	$88.8	$177.8	49.9%	28.6%
1983	167.9	22.0	143.3	289.2	49.6	13.1
1984	219.9	22.1	138.5	336.3	41.1	10.1
1985	220.7	24.0	233.9	430.6	54.3	10.9
1986	334.3	27.1	349.8	657.0	53.2	7.1
1987	530.9	36.1	468.2	963.0	48.6	6.8
1988	632.4	53.3	569.8	1,148.9	49.6	8.4
1989	744.2	83.1	786.7	1,447.8	54.3	11.2
1990	785.1	88.0	861.5	1,558.6	55.3	11.2

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

SOUTH KOREA

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990p	1986	1987	1988	1989	1990p
MACHINE TOOL TOTAL	28,289	56,903	132,427	48,744	54,789	$334.3	$530.9	$632.4	$744.2	$765.1
METAL CUTTING TOTAL	25,390	52,695	128,412	46,361	52,641	214.8	393.5	482.9	602.9	638.1
NC Metal Cutting Machines										
NC lathes	803	1,356	1,453	1,952	2,298	38.5	72.0	84.2	137.9	142.1
NC milling machines	95	103	107	94	211	7.1	9.8	11.3	10.5	20.5
Machining centers	210	410	477	572	785	24.8	50.8	62.8	75.0	91.8
NC EDM	—	96	68	90	92	—	6.4	7.4	9.6	8.8
NC boring machines	—	3	2	12	8	—	0.3	0.2	2.2	1.1
NC gear cutting machines	3	3	12	8	11	0.4	0.4	1.8	2.4	2.8
NC grinding machines	—	15	7	15	28	—	1.0	0.7	1.3	2.2
NC drilling machines	—	4	3	14	11	—	0.4	0.3	2.8	3.1
NC transfer machines	12	46	(a)	(a)	(a)	3.4	18.7	(a)	(a)	(a)
NC planing machines	1	3	—	9	6	0.1	0.5	—	8.9	4.1
Non–NC Metal Cutting Machines										
Lathes	5,730	6,756	7,658	7,411	7,924	46.1	64.6	90.5	104.9	108.6
Milling machines	2,513	3,269	3,275	3,183	3,642	26.7	44.2	55.8	64.6	71.3
Drilling machines	4,263	5,775	6,331	5,604	5,145	8.8	13.1	19.1	22.0	23.7
Boring machines	51	69	91	81	87	3.4	5.9	9.8	9.4	10.2
Grinding machines	2,019	2,241	65,051	1,602	1,596	14.9	24.4	34.7	35.9	35.2
EDM	290	371	300	228	277	6.1	8.1	8.4	7.9	8.3
Sawing machines	7,533	29,402	40,354	22,867	27,923	4.0	8.7	11.4	11.3	13.0
Gear cutting machines	64	103	102	110	42	1.0	8.2	6.3	7.5	6.7
Tapping machines	1,071	1,704	2,204	1,847	1,791	1.0	2.3	3.3	2.6	2.2
Transfer machines	387	415	374	379	496	15.9	47.4	56.9	68.0	65.6
Shaping machines	56	67	44	78	34	1.4	0.8	0.3	0.7	0.3
Planing machines	14	17	22	17	11	0.9	1.1	3.0	2.7	2.3
Other metal cutting	275	467	477	188	223	10.2	4.4	14.8	14.6	14.1
METAL FORMING TOTAL	2,899	4,208	4,015	2,383	2,148	119.5	137.4	149.4	141.4	147.0
Presses	2,346	3,591	3,374	1,882	1,916	103.3	119.2	125.1	116.6	126.8
Rolling machines	na	na	na	na	na	7.4	8.2	9.0	9.2	14.3
Shearing machines	43	53	17	26	42	2.8	1.6	0.6	2.0	1.4
Wire drawing machines	157	197	202	70	22	4.5	6.5	13.3	9.6	1.8
Bending machines	29	19	20	19	29	0.2	0.2	0.2	0.1	0.3
Other metal forming	324	346	402	386	139	1.4	1.8	1.2	3.8	2.5

Source: Korea Machine Tool Manufacturers' Association (KOMMA)
Note: (a) – included in "non–NC transfer machines," p – preliminary, na – not available

SOUTH KOREA

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990p	1986	1987	1988	1989	1990p
MACHINE TOOL TOTAL	5,596	33,385	511,866	34,366	29,371	$27.1	$36.1	$53.3	$83.1	$88.0
METAL CUTTING TOTAL	4,419	25,128	44,698	15,392	18,789	25.3	31.5	47.8	72.2	68.3
NC metal cutting machines										
NC lathes	260	335	664	876	806	11.8	17.1	24.6	38.1	28.7
NC millling machines	—	1	3	1	6	—	(a)	(a)	0.1	0.1
Machining centers	35	84	174	189	222	1.8	4.6	7.2	9.6	13.4
NC drilling machines	—	2	5	85	19	—	0.1	0.2	0.6	1.3
NC boring machines	1	—	—	4	2	0.1	—	—	(a)	0.2
NC grinding machines	—	—	—	4	1	—	—	—	0.1	0.1
Non–NC metal cutting machines										
Lathes	1,370	8,980	916	1,821	632	8.4	6.0	6.4	6.4	6.2
Milling machines	106	92	434	361	309	1.0	1.0	2.0	4.2	3.8
Drilling machines	95	141	169	280	224	0.2	0.2	0.4	1.1	1.7
Boring machines	7	45	7	2	35	0.1	0.1	0.1	(a)	0.1
Grinding machines	351	137	17,918	2,722	1,484	0.5	0.6	1.1	3.1	1.6
Gear cutting machines	25	86	11	21	38	0.5	0.3	0.1	1.0	0.7
EDM	2	130	21	9	24	(a)	0.1	0.4	0.2	0.6
Sawing machines	(b)	(b)	(b)	5,078	5,544	0.0	0.0	0.0	0.9	2.0
Metal cutting n.e.c.	2,167	15,095	24,376	3,939	9,443	0.9	1.4	5.3	6.9	7.8
METAL FORMING TOTAL	1,177	8,257	467,168	18,974	10,582	1.8	4.6	5.5	10.9	19.7
Presses	30	154	948	470	1,422	0.4	1.7	1.5	2.5	5.7
Drawing machines	—	12	—	504	(c)	—	0.1	—	0.6	(c)
Shearing machines	183	8	167	200	81	0.7	0.1	0.5	2.6	4.7
Punching & notching	(c)	(c)	(c)	4,237	5,237	(c)	(c)	(c)	0.2	1.1
Bending machines	28	107	38,288	685	(c)	0.0	0.1	0.7	0.7	(c)
Forging machines	10	12	341,911	3,034	313	0.1	0.1	0.4	0.4	0.7
Thread rolling mach.	(c)	(c)	(c)	8,511	2,866	(c)	(c)	(c)	1.5	0.7
Metal forming n.e.c.	926	7,964	85,854	1,333	663	0.6	2.5	2.4	2.3	6.7

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

Note: p – preliminary, n.e.c. – not elsewhere classified, (a) – less than $50,000, (b) – included in "metal cutting n.e.c.," (c) – included in "metal forming n.e.c."

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SOUTH KOREA

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990p	1986	1987	1988	1989	1990p
MACHINE TOOL TOTAL	6,534	12,910	80,374	25,609	19,317	$349.8	$468.2	$569.8	$786.7	$861.5
METAL CUTTING TOTAL	5,117	11,183	75,268	21,782	15,649	233.2	328.1	434.2	550.2	642.3
NC Metal Cutting Machines										
NC lathes	168	192	163	261	552	17.6	17.7	23.1	25.8	42.6
NC milling machines	52	128	91	74	112	9.5	14.1	13.2	21.0	14.7
Machining centers	28	50	na	164	198	8.3	10.8	13.0	32.6	30.8
NC boring machines	(a)	42	62	44	117	(a)	9.8	13.6	9.2	18.1
NC gear cutting mach.	(b)	272	131	101	166	(b)	20.7	23.9	20.2	35.9
NC grinding machines	(c)	(c)	251	173	384	(c)	(c)	42.9	44.8	54.5
NC drilling machines	(d)	40	30	101	173	(d)	4.4	3.1	8.5	19.4
NC others	—	—	—	—	3	—	—	—	—	1.0
Non–NC Metal Cutting Machines										
Lathes	392	1,469	10,819	3,240	2,253	15.3	28.1	33.6	39.3	32.8
Milling machines	348	1,442	5,794	2,016	1,522	12.3	26.5	16.2	28.1	26.2
Drilling machines	630	1,095	1,314	2,498	2,300	14.5	18.7	9.3	7.1	7.7
Boring machines	186	87	1,100	205	823	23.9	13.5	17.9	33.0	31.4
Grinding machines	696	2,791	1,618	2,588	1,745	59.2	77.4	83.0	79.0	82.1
Gear cutting mach.	420	134	149	230	397	17.2	11.8	13.1	15.3	31.0
EDM	134	276	351	371	337	9.6	17.9	25.9	25.2	31.5
Metal cutting n.e.c.	2,063	3,165	53,395	9,716	4,567	45.9	56.7	102.4	161.1	182.7
METAL FORMING TOTAL	1,417	1,727	5,106	3,827	3,668	116.6	140.1	135.6	236.5	219.1
Presses	314	486	4,023	971	582	71.8	51.6	37.4	85.3	78.2
Wire drawing mach.	137	137	76	172	(e)	1.6	11.4	3.0	4.3	(e)
Shearing machines	30	60	149	405	(e)	8.2	6.1	12.8	25.1	(e)
Bending machines	48	113	296	553	(e)	2.4	8.7	21.7	38.0	(e)
Forging machines	46	137	na	219	315	8.9	28.3	26.5	39.2	23.9
Metal forming n.e.c.	842	794	562	1,507	2,771	23.6	34.1	34.2	32.5	117.0

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

Note: p – preliminary, n.e.c. – not elsewhere classified, (a) – included in non–NC boring machines, if any, (b) – included in non–NC gear cutting machines, if any, (c) – included in non–NC grinding machines, if any, (d) – included in non–NC drilling machines, if any, (e) – included in "metal forming n.e.c."

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SOUTH KOREA

Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$27.1	$36.1	$53.3	$83.1	$88.0
United States	10.8	13.8	18.1	27.7	19.5
Japan	4.4	3.5	8.8	15.7	18.0
Indonesia	0.7	0.5	0.5	2.0	7.0
West Germany	4.2	2.8	5.2	5.0	5.6
Netherlands	0.5	1.3	1.4	2.9	4.6
Italy	—	1.0	1.0	3.2	4.4
France	0.4	0.8	2.6	3.1	3.6
United Kingdom	1.4	1.0	2.7	2.6	2.2
Saudi Arabia	0.2	0.3	0.2	1.4	1.5
Singapore	0.1	0.7	1.3	1.1	1.0
Canada	0.6	0.4	1.0	1.1	0.6
Australia	0.3	0.3	0.3	0.3	0.3
All other countries	3.4	9.7	10.2	15.3	19.7

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

SOUTH KOREA

Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$349.8	$468.2	$569.8	$786.7	$861.5
Japan	265.7	305.8	347.1	451.1	495.3
United States	26.1	62.6	84.2	126.9	125.4
West Germany	33.4	43.3	68.5	99.3	106.6
Switzerland	10.6	17.9	18.5	32.0	32.9
Taiwan	1.4	10.8	24.4	26.4	23.1
United Kingdom	3.6	6.6	6.5	7.0	18.4
Italy	3.4	9.7	6.1	10.8	13.1
Sweden	0.5	2.3	3.6	4.8	2.4
All other countries	5.0	9.2	11.1	28.4	44.3

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

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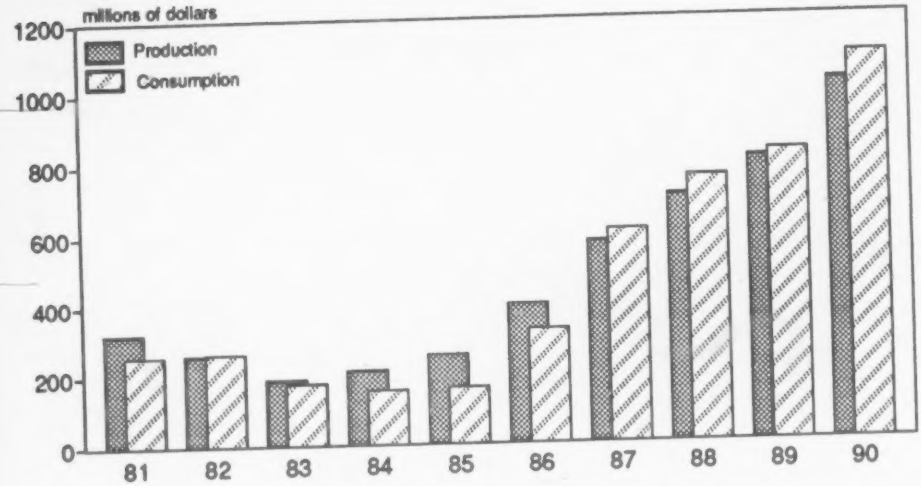

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1975	$223.1	$168.7	$86.5	$305.3	55.3%	38.8%	11,600
1976	183.6	132.7	90.8	225.5	58.8	49.5	11,000
1977	190.9	91.4	102.5	179.7	50.9	53.7	10,500
1978	232.2	90.1	147.6	[illegible]	51.0	63.6	10,003
1979	315.8	91.3	210.8	196.4	46.5	66.8	10,000
1980	352.8	103.2	228.3	227.8	45.3	64.7	9,500
1981	320.0	142.0	207.0	255.0	55.7	64.7	8,800
1982	260.2	176.7	175.5	261.4	67.6	67.4	8,500
1983	188.2	86.2	99.4	175.1	49.2	52.8	7,600
1984	211.5	56.1	113.3	154.4	36.3	53.6	7,300
1985	252.9	58.9	151.5	160.3	36.7	59.9	7,300
1986	396.3	105.8	178.7	323.4	32.7	45.1	7,600
1987	575.0	250.7	218.8	606.8	41.3	38.1	7,700
1988	702.2	311.6	260.2	753.6	41.3	37.1	7,800
1989	806.7	341.6	323.7	824.6	41.4	40.1	7,800
1990	1,020.0	527.0	454.0	1,093.0	48.2	44.5	7,838

Source: Asociacion Espanola de Fabricantes de Maquinas–Herramienta (AFM)

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	$396.3	$575.0	$702.2	$806.7	$1,020.0
of which NC	158.5	214.9	283.5	363.0	534.0
METAL CUTTING TOTAL	307.6	437.7	527.0	615.9	722.0
of which NC	na	205.2	255.4	330.4	441.0
Lathes	70.6	88.3	103.3	102.8	113.0
of which NC	38.3	42.5	54.1	50.2	61.0
Milling machines	103.0	140.1	148.9	204.1	263.0
of which NC	55.0	80.0	90.1	140.9	191.0
Grinding machines	25.1	36.8	44.7	53.2	74.0
of which NC	8.3	11.9	13.3	15.5	34.0
Boring machines	12.9	11.3	11.1	15.2	22.0
of which NC	8.7	0.0	8.4	8.9	14.0
Drilling machines	12.9	14.2	17.8	18.9	24.0
of which NC	na	—	0.5	0.1	1.0
Sawing & cut-off machines	5.5	5.3	13.1	16.8	22.0
of which NC	—	0.1	—	na	0.2
Threading and tapping	(b)	(b)	(b)	2.0	(b)
Gear cutting machines	(b)	(b)	(b)	0.1	(b)
Transfer & special purpose	26.4	46.4	50.4	47.0	59.0
of which NC	na	12.8	10.7	na	35.0
Machining centers	19.7	35.0	47.9	61.8	71.0
Horizontal	13.3	21.7	na	na	na
Vertical	6.4	13.3	na	na	na
Spark erosion machines	(b)	(b)	(b)	26.0	34.0
of which NC	(b)	(b)	(b)	na	31.0
Metal cutting n.e.c.	31.5	60.3	89.8	68.0	39.0
of which NC	na	15.8	30.3	na	2.0
METAL FORMING TOTAL	88.7	137.3	175.3	190.8	298.0
of which NC	7.1	9.7	28.1	32.6	92.0
Mechanical presses	19.7	25.9	38.9	45.8	52.0
of which NC	—	—	1.8	na	14.0
Hydraulic presses	9.0	17.1	23.9	26.9	24.0
of which NC	—	0.6	—	na	3.0
Guillotine shears	6.4	9.0	12.8	26.0	27.0
of which NC	na	0.4	5.8	1.2	7.0
Press Brakes	8.3	12.6	17.0	24.4	23.0
of which NC	na	2.5	11.4	8.2	13.0
Punching machines	(c)	(c)	(c)	8.5	11.0
of which NC	(c)	(c)	(c)	7.9	11.0
Metal forming n.e.c.	45.2	72.7	82.7	59.2	160.0
of which NC	na	6.2	9.0	na	45.0

Source: Asociacion Espanola de Fabricantes de Maquinas–Herramienta (AFM)

Note: na – not available, n.e.c. – not elsewhere classified, (b) – included in "metal cutting n.e.c.," (c) – included in "metal forming n.e.c."

SPAIN

Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$105.8	$250.7	$311.6	$341.6	$527.0
West Germany	34.1	58.0	73.3	105.6	221.0
Italy	19.1	44.8	69.4	66.3	104.0
Japan	15.7	25.1	48.8	37.7	52.0
United Kingdom	6.8	35.8	24.0	21.3	25.0
Switzerland	8.9	17.6	18.1	20.2	24.0
France	6.1	28.0	13.8	18.6	19.0
United States	5.1	7.4	24.6	11.6	17.0
Belgium–Luxembourg	1.3	6.4	4.2	7.0	11.0
Taiwan	0.3	1.9	4.6	8.8	9.0
Sweden	0.9	0.9	2.8	3.1	6.0
East Germany	1.9	7.1	3.3	15.1	4.0
Netherlands	0.4	2.1	3.2	2.2	(b)
All other countries	5.2	14.5	27.9	22.1	35.0

SPAIN

Machine Tool Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$178.7	$218.8	$260.2	$323.7	$454.0
France	17.4	22.9	30.5	40.1	82.0
West Germany	32.0	39.3	37.2	53.6	80.0
United States	20.8	17.1	22.2	25.7	36.0
Italy	6.6	11.2	13.1	17.6	30.0
Portugal	7.3	12.9	25.2	18.9	29.0
Brazil	0.5	3.2	2.2	3.4	23.0
United Kingdom	12.6	13.0	17.0	19.7	21.0
Netherlands	7.5	9.1	6.4	6.9	14.0
Mexico	4.1	3.4	2.2	15.2	13.0
Sweden	5.6	7.5	9.1	7.9	12.0
Switzerland	3.1	4.1	4.6	3.4	8.0
Austria	2.6	3.4	3.4	3.8	7.0
Belgium–Luxem.	4.0	4.0	4.7	4.9	7.0
Finland	3.6	2.8	4.5	5.5	7.0
Soviet Union	0.4	0.9	0.1	4.2	6.0
Canada	3.9	3.7	3.8	3.4	5.0
India	1.6	4.1	2.6	4.8	5.0
Cuba	4.2	7.6	11.0	9.9	(b)
Czechoslovakia	(a)	2.0	0.7	13.4	(b)
East Germany	—	0.1	7.5	8.6	(b)
Venezuela	3.4	4.3	11.1	6.1	(b)
All other countries	37.5	42.2	41.1	46.7	69.0

Source: Asociacion Espanola de Fabricantes de Maquinas–Herramienta (AFM)

Note: (a) – less than $50,000 b = included in "All other countries"

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SPAIN

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	31,276	84,786	347,664	104,935	1,163,566	$178.7	$218.8	$260.2	$323.7	$454.0
METAL CUTTING TOTAL	12,279	55,371	55,088	39,230	91,581	142.5	172.2	194.3	252.1	355.0
Lathes	1,600	1,708	1,505	1,603	1,821	25.0	28.9	37.0	36.6	52.0
NC	58	445	204	275	na	6.5	8.4	16.6	14.5	na
Horizontal	na	385	170	133	na	6.1	7.6	15.5	13.1	na
Vertical	na	13	21	(e)	na	0.1	0.2	0.4	(e)	na
Other	na	47	13	142	na	0.3	0.6	0.7	1.4	na
Non–NC	1,542	1,263	1,301	1,328	na	18.5	20.5	20.3	22.1	na
Horizontal	na	704	1,255	1,325	na	14.3	16.2	18.7	20.0	na
Vertical	na	9	3	(e)	na	0.2	0.1	0.2	(e)	na
Other	na	550	43	3	na	4.0	4.2	1.4	2.1	na
Boring & boring–milling	85	105	126	104	609	9.1	7.2	6.9	4.6	15.0
NC	32	49	57	24	na	0.9	1.5	2.3	1.9	na
Boring–milling	na	47	13	22	na	0.4	1.4	0.8	1.9	na
Other boring	na	2	44	2	na	0.5	0.1	1.5	(a)	na
Non–NC	53	56	69	80	na	8.1	5.7	4.6	2.7	na
Boring–milling	na	34	54	38	na	7.6	4.6	1.6	1.9	na
Other boring	na	22	15	42	na	0.5	1.1	3.0	0.8	na
Milling machines	5,270	44,578	7,039	6,902	8,790	65.7	81.2	85.6	111.1	169.0
of which NC	283	267	988	2,430	na	12.7	25.6	50.8	64.5	na
Drilling machines	1,763	1,421	5,088	1,562	13,571	7.4	6.8	6.9	8.8	15.0
NC	1	95	3,551	50	na	0.3	0.6	0.5	1.4	na
Radial	na	6	3,501	na	na	0.1	0.1	0.2	na	na
Other	na	89	51	na	na	0.2	0.5	0.3	na	na
Non–NC	1,762	1,326	1,536	1,512	na	7.1	6.2	6.5	7.4	na
Radial	na	83	62	na	na	2.0	1.4	1.2	na	na
Other	na	1,243	1,474	na	na	5.1	4.8	5.3	na	na
Grinding, polishing, etc.	840	3,868	25,171	6,377	20,879	14.2	19.4	23.5	26.5	28.0
NC grinding	12	57	56	50	na	0.7	3.7	8.9	8.4	na
Non–NC grinding	(d)	3,250	(d)	1,750	na	8.6	12.5	(d)	13.1	na
Other polishing, etc.	828	561	25,115	4,577	na	4.9	3.1	14.6	4.9	na

(continued)

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SPAIN

Exports by Type of Machine
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Machining centers	(b)	67	153	123	234	$6.0	$10.1	$13.5	$19.9	$41.0
Transfer machines	(b)	19	48	47	(b)	0.3	0.5	1.4	14.9	(b)
Planing machines	(b)	7	5	8	(b)	(a)	0.3	(a)	0.3	(b)
Shape, slot, broach, saw	na	2,896	2,135	1,911	28,956	3.7	4.4	3.7	7.0	4.0
NC	na	4	na	na	na	(a)	(a)	na	na	na
Non–NC shaping & slotting	na	871	191	231	(b)	1.3	1.5	1.5	1.8	(b)
Non–NC broaching machines	na	12	8	1	(b)	0.1	0.4	0.1	(a)	(b)
Non–NC sawing & cut–off	na	2,009	1,936	1,679	na	2.3	2.5	2.1	5.2	na
Jig boring machines	(b)	4	72	na	(b)	0.3	0.4	1.0	(b)	(b)
of which NC	(b)	—	18	na	(b)	(a)	—	0.2	(b)	(b)
EDM	262	278	248	227	219	9.8	11.0	6.0	10.8	14.0
Gear cutting & finishing	(b)	108	127	509	(b)	(b)	0.2	0.5	1.0	(b)
of which NC	(b)	na	—	—	(b)	(b)	na	—	—	(b)
Threading or tapping machines	75	104	462	83	(b)	0.7	0.6	2.3	1.6	(b)
Metal cutting n.e.c.	2,384	208	12,909	19,774	16,502	0.1	1.2	6.0	9.0	17.0
METAL FORMING TOTAL	18,997	29,415	292,576	65,705	1,071,985	36.2	46.7	65.9	71.6	99.0
Forging & stamping machines	29	44	45	109	546	1.0	0.7	2.5	2.4	2.0
Bend., fold., flat., etc.	781	1,925	1,372	1,637	7,010	5.1	4.5	14.5	11.2	22.0
of which NC	13	17	353	363	na	0.2	0.2	1.6	2.6	na
Presses	840	812	55,337	4,725	3,082	13.5	18.6	14.0	21.3	25.0
Hydraulic	na	296	473	208	na	2.8	5.4	2.5	2.9	na
Other presses	na	506	54,729	4,517	na	10.5	12.9	11.4	18.4	na
Rivet, screw, nut–making	na	10	135	(g)	na	0.2	0.3	0.2	(g)	na
Punching & shearing	14,215	14,291	20,791	19,107	20,025	7.1	9.4	17.3	19.9	24.0
of which NC	2	60	34	113	na	0.2	0.5	2.4	1.7	na
Wire working machines	263	206	528	304	217	2.3	2.9	4.1	3.6	5.0
Thread rolling machines	204	304	161	231	(c)	1.0	1.8	1.9	2.5	(c)
Drawing machines	43	2,942	51	2,099	(c)	0.4	0.2	0.7	0.7	(c)
Metal forming n.e.c.	2,622	9,097	214,291	37,493	1,041,105	5.8	8.6	10.9	10.0	21.0

Source: Asociacion Espanola de Fabricantes de Maquinas–Herramienta (AFM)

Note: na – not available, n.e.c. – not elsewhere classified, (a) – less than $50,000, (b) – included in "metal cutting n.e.c.," (c) – included in "metal forming n.e.c.," (d) – included in "other polishing, etc," (e) – included in "other lathes," (g) – included in "other presses"

SPAIN

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	29,855	226,291	184,904	141,829	154,876	$105.8	$250.7	$311.6	$341.6	$527.0
METAL CUTTING TOTAL	23,521	140,412	88,358	109,771	138,494	61.3	158.3	184.2	168.3	283.0
Lathes	644	1,066	1,866	1,976	3,707	14.8	25.8	41.6	47.1	74.0
NC	133	376	545	660	na	10.6	17.8	28.4	35.0	na
Horizontal	na	299	478	582	na	10.0	16.8	26.8	30.0	na
Vertical	na	59	15	(e)	na	0.4	0.8	0.9	(e)	na
Other	na	18	52	78	na	0.3	0.2	0.7	5.0	na
Non–NC	511	690	1,321	1,316	na	4.2	8.1	13.2	12.2	na
Horizontal	na	540	1,242	1,307	na	3.5	5.4	10.0	10.9	na
Vertical	na	10	12	(e)	na	0.2	0.6	1.3	(e)	na
Other	na	140	67	9	na	0.5	2.1	1.9	1.3	na
Boring & boring–milling	87	65	105	63	85	1.0	11.7	3.4	1.4	2.0
NC	—	12	11	27	na	(a)	10.6	1.7	0.8	na
Boring–milling	na	1	6	22	na	—	(a)	0.7	0.8	na
Other boring	na	11	5	5	na	(a)	10.6	1.0	(a)	na
Non–NC	87	53	94	36	na	1.0	1.0	1.7	0.6	na
Boring–milling	na	17	62	9	na	0.2	0.2	0.4	0.2	na
Other boring	na	36	32	27	na	0.7	0.8	1.3	0.4	na
Milling machines	246	670	1,875	1,269	1,266	3.1	6.1	14.1	11.4	12.0
of which NC	34	142	1,134	220	na	1.6	4.3	7.1	6.7	na
Drilling machines	2,483	31,413	11,065	11,458	9,255	3.1	24.4	5.1	8.6	5.0
NC	14	95	168	800	na	1.5	22.4	2.8	6.0	na
Radial	na	5	6	na	na	0.6	0.5	0.4	na	na
Other	na	90	162	na	na	0.8	21.9	2.4	na	na
Non–NC	2,469	31,318	10,897	10,658	na	1.2	2.0	2.3	2.6	na
Radial	na	851	601	na	na	0.1	0.2	0.2	na	na
Other	na	30,467	10,296	na	na	1.1	1.8	2.1	na	na
Grinding, polishing, etc.	16,096	42,717	27,391	41,491	58,759	13.7	35.3	34.6	35.8	45.0
NC grinding	8	20	756	38	na	1.3	3.3	3.8	6.5	na
Non–NC grinding	(d)	2,264	(d)	3,650	na	(d)	8.5	(d)	10.3	na
Other polishing, etc.	16,084	40,433	26,635	37,803	na	12.3	23.5	30.8	19.1	na
Machining centers	86	145	232	313	327	11.8	17.7	36.8	29.0	38.0
Transfer machines	(b)	50	738	419	(b)	1.6	11.5	4.5	2.5	(b)

(continued)

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(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Planing machines	—	10	6	21	(b)	—	$0.2	$0.2	$0.1	(b)
Shape, slot, broach, saw	na	7,501	7,833	22,433	8,824	3.2	10.5	11.9	14.5	na
NC	na	14	na	na	na	0.3	3.3	na	na	na
Non–NC shaping & slotting	na	200	64	22	(b)	(a)	0.3	0.2	0.1	(b)
Non–NC broaching machines	na	26	12	4	(b)	(a)	1.3	0.4	(a)	(b)
Non–NC sawing & cut–off	na	7,261	7,757	22,407	na	2.9	5.6	11.3	14.4	19.0
Jig boring machines	(b)	50	160	na	(b)	1.3	4.7	6.7	(b)	(b)
of which NC	(b)	28	124	na	(b)	0.8	4.3	5.2	(b)	(b)
EDM	30	(b)	121	117	128	2.8	(b)	8.2	6.9	9.0
Gear cutting & finishing	17	175	25,241	155	(b)	1.5	2.1	4.5	4.6	(b)
of which NC	4	na	8	8	(b)	0.8	1.6	1.6	1.9	(b)
Threading or tapping	491	857	764	468	(b)	0.8	0.8	1.2	1.1	(b)
Metal cutting n.e.c.	3,341	55,693	10,961	29,588	56,143	2.4	7.5	11.4	5.1	79.0
METAL FORMING TOTAL	6,334	85,879	96,546	32,058	16,382	44.5	92.4	127.4	173.2	244.0
Forging & stamping	33	5,196	423	317	618	7.5	14.8	21.6	31.1	50.0
Bend., fold., flat., etc.	568	na	na	14,189	4,248	6.9	11.0	20.7	33.3	37.0
of which NC	33	na	na	190	na	2.2	4.1	4.7	9.3	na
Presses	363	671	2,286	6,350	6,712	9.1	24.1	20.8	35.1	44.0
Hydraulic	na	148	302	235	303	3.1	8.5	5.1	18.7	22.0
Mechanical	na	495	1,967	6,115	6,409	5.1	8.7	13.1	16.3	22.0
Rivet, screw, nut–making	na	28	17	na	na	0.9	6.9	2.7	na	na
Punching & shearing	298	1,613	1,404	2,177	1,507	7.2	14.8	31.4	33.8	23.0
of which NC	46	565	187	590	na	3.9	7.8	20.1	19.1	na
Wire working machines	662	(c)	538	764	313	3.9	(c)	5.5	10.8	12.0
Thread rolling machines	7	13	275	18	(c)	0.1	0.4	11.7	0.7	(c)
Drawing machines	16	18	(c)	4,240	(c)	0.7	1.8	(c)	9.0	(c)
Metal forming n.e.c.	4,387	76,939	91,620	4,003	2,984	9.1	25.5	15.7	19.3	78.0

Source: Asociacion Espanola de Fabricantes de Maquinas–Herramienta (AFM)

Note: na – not available, n.e.c.– [illegible] elsewhere classified, (a) – less than $50,000, (b) – included in "metal cutting n.e.c.," (c) – included in "metal forming n.e.c.," (d) – included in "other polishing, etc," (e) – included in "other lathes"

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SWEDEN *Industry Overview*

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Expor[illegible] as % of P[illegible]d.
1980	234.0	242.8	240.6	236.2	102.8%	102.8[illegible]
1981	210.9	191.6	164.3	238.2	80.4	77.9
1982	165.0	151.2	138.5	177.7	85.1	83.9
1983	142.4	129.6	114.5	157.5	82.3	80.4
1984	142.1	127.8	124.9	145.0	88.1	87.9
1985	161.4	157.0	139.4	179.0	87.7	86.4
1986	210.7	229.3	164.6	275.4	83.3	78.1
1987	223.0	312.3	192.8	342.5	91.2	86.5
1988	215.6	340.5	213.7	342.4	99.4	99.1
1989	na	354.0	215.8	na	na	na
1990	na	348.1	269.0	na	na	na

Source: The Swedish Machine Tool and Cutting Tool Manufacturers' Association
Note: na – not available

SWEDEN *Production*

(millions of U.S. dollars)

	UNITS			VALUE		
	1986	1987	1988	1986	1987	1988
MACHINE TOOL TOTAL	na	na	na	$210.7	$223.0	$215.6
METAL CUTTING TOTAL	na	na	na	131.8	133.9	115.2
Machining centers	—	—	2	—	—	(a)
Drilling & boring machines	6,241	6,258	na	14.8	13.6	4.4
NC	2	—	na	1.2	—	3.5
Non–NC	6,239	6,258	na	13.6	13.6	0.8
Gear cutting machines	—	—	—	—	—	—
Grinding, polishing, etc.	61,544	40,435	na	57.8	60.9	47.3
NC	43	40	89	7.5	4.7	42.3
Non–NC	61,501	40,395	na	50.3	56.2	5.0
Lathes	349	296	113	31.0	28.3	22.8
Milling & boring–milling	74	175	na	26.9	36.1	32.2
NC	63	164	na	23.0	26.0	29.4
Non–NC	11	11	63	3.9	4.0	2.8
Broaching machines	—	—	—	—	—	—
Planers and shapers	—	—	—	—	—	—
Threading & tapping	39	na	24	0.7	0.5	2.3
Sawing & cut–off	221	201	140	0.6	0.6	0.4
Metal cutting n.e.c.	—	—	na	—	—	6.0
METAL FORMING TOTAL	na	na	na	78.9	89.1	100.4
Forging machines, incl. hammers	na	na	na	1.1	1.3	8.0
Hydraulic presses	72	82	na	17.1	19.7	38.5
Other presses	76	67	na	3.2	3.8	(b)
Bend, fold, form, straight.	1,062	1,070	na	15.2	15.7	16.3
Shearing machines	(c)	(c)	537	(c)	(c)	10.2
Punching, incl. punch presses	240	249	na	10.3	11.5	5.4
Metal forming n.e.c.	na	na	na	32.0	37.0	21.9
Machine vices and chucks	na	na	na	4.6	5.6	24.3
Other parts and accessories	na	na	na	83.8	99.4	56.3

Source: The Swedish Machine Tool and Cutting Tool Manufacturers' Association
Note: (a) – less than $50,000, (b) – included in "other metal forming machines," (c) – included in "punching, incl. punch presses," na = not available, n.e.c. – not elsewhere classified

Imports and Exports by Type of Machine

(millions of U.S. dollars)

	IMPORTS				EXPORTS			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	$312.3	$340.5	$354.0	$348.1	$192.8	$213.7	$215.8	$289.0
METAL CUTTING TOTAL	222.8	249.0	271.3	256.3	120.6	121.4	134.1	167.0
Physico-chemical mach.	7.8	1.5	0.6	3.9	0.6	0.0	0.0	(a)
Machining centers	(b)	70.8	74.8	67.9	(b)	8.2	9.4	15.9
Lathes	56.1	64.9	75.1	69.0	21.9	19.2	22.9	29.9
NC automatic	30.6	36.4	55.4	48.8	0.8	14.5	16.2	20.4
Non-NC automatic	4.3	13.4	9.1	8.2	2.1	3.5	4.8	7.2
Other NC	12.0	11.7	8.4	10.5	16.3	0.2	1.1	0.5
Other non-NC	9.2	3.4	2.2	1.5	2.7	0.9	0.8	1.8
Drilling & boring	10.2	9.2	10.8	11.0	10.8	10.8	12.2	13.1
NC	6.3	5.2	7.8	8.3	1.4	1.3	1.9	2.7
Non-NC	3.9	4.0	3.0	2.7	9.4	9.4	10.3	10.4
Milling, boring-milling	37.5	33.6	29.2	41.2	19.1	8.6	6.5	8.6
NC	28.1	27.5	20.9	33.0	14.2	3.9	2.9	4.8
Non-NC	9.4	6.1	8.3	8.2	4.9	4.7	3.6	3.8
Threading & tapping	1.6	1.3	0.5	0.8	1.1	2.1	1.6	1.8
Grinding machines	32.9	34.5	45.2	33.4	65.7	63.5	74.8	91.5
NC	na	15.0	27.9	17.0	na	49.0	57.8	76.1
Non-NC	na	19.6	17.3	16.4	na	14.6	17.0	15.4
Planers & shapers	0.5	1.0	0.4	0.1	(a)	0.9	0.2	0.2
Sawing & cut-off	8.7	11.3	13.3	12.6	0.7	2.2	0.9	1.3
Broaching machines	0.9	1.2	0.1	0.7	(a)	0.2	(a)	0.1
Gear cutting machines	6.8	2.5	4.6	1.8	0.5	0.1	1.3	0.4
Metal cutting n.e.c.	59.9	17.2	16.8	13.8	0.1	5.6	4.3	4.2
METAL FORMING TOTAL	89.5	91.5	82.7	91.7	72.2	92.3	81.7	122.0
Forging & hammers	1.3	2.2	3.0	5.0	1.3	6.4	0.8	1.3
Punching & shearing	27.1	33.5	33.3	32.0	22.5	29.9	22.7	28.2
Bend, fold, form, etc.	21.2	23.0	18.2	26.9	9.2	11.4	20.6	29.9
Hydraulic presses	11.4	11.9	11.4	6.6	18.9	30.8	14.6	43.0
Other presses	11.5	(c)	(c)	(c)	0.6	(c)	(c)	(c)
Metal forming n.e.c.	17.0	20.9	16.9	21.1	19.7	13.8	23.1	19.7
Machine vices & chucks	na	19.8	18.3	20.5	na	40.6	42.0	42.3
Other parts & access.	na	54.7	71.9	82.6	na	55.2	67.0	89.8

Source: The Swedish Machine Tool and Cutting Tool Manufacturers' Association

Note: na = not available, n.e.c. = not elsewhere classified, (a) – less than $50,000, (b) – included in "metal cutting n.e.c.," (c) – included in "metal forming n.e.c."

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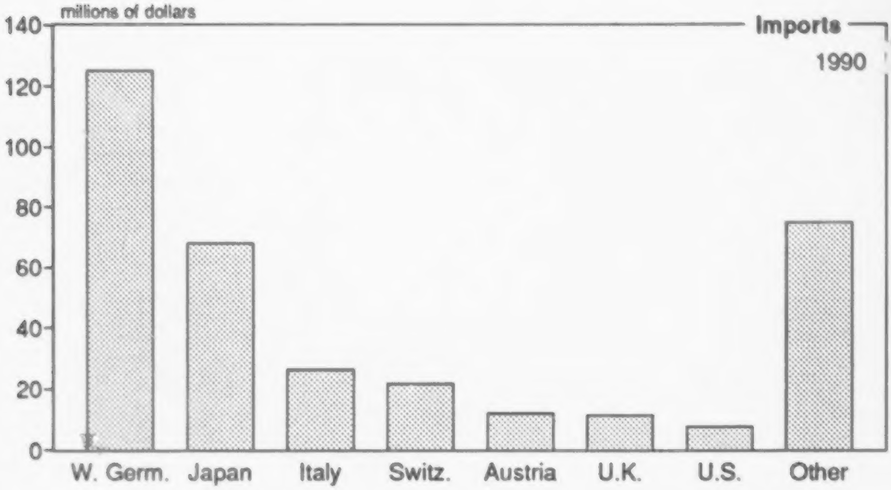
Imports and Exports by Country

(millions of U.S. dollars)

	IMPORTS FROM				EXPORTS TO			
Country	1987	1988	1989	1990	1987	1988	1989	1990
TOTAL	$312.3	$340.5	$354.0	$348.1	$192.8	$213.7	$215.8	$289.0
Austria	4.1	2.8	5.7	12.1	2.6	2.4	3.8	5.3
Czechoslovakia	4.9	4.1	3.8	3.6	0.9	2.2	2.4	1.6
Denmark	8.3	11.3	10.3	7.9	8.7	13.3	13.2	15.8
Finland	6.3	6.9	6.1	9.7	11.0	12.0	11.7	17.8
France	4.2	7.3	6.8	10.9	5.3	10.5	17.4	18.3
Italy	41.0	36.4	34.4	26.4	10.7	7.3	5.9	8.7
Japan	53.4	62.3	60.9	68.1	0.6	2.5	4.7	2.8
Netherlands	5.3	5.5	3.8	5.9	4.4	4.7	5.6	9.5
Norway	1.7	2.3	1.4	1.0	12.1	7.8	6.6	8.1
Poland	1.3	1.1	0.7	0.6	2.3	5.8	3.8	5.3
Spain	9.1	8.5	7.8	9.4	1.3	2.1	3.7	4.1
Switzerland	22.6	23.4	23.9	21.8	4.3	3.7	4.2	7.6
Taiwan	7.2	11.1	16.3	11.4	0.4	1.1	0.6	1.4
United Kingdom	17.4	11.2	11.5	11.5	20.8	24.3	25.9	19.9
United States	8.9	4.[illegible]	7.0	7.9	26.0	27.7	26.5	47.2
USSR	0.6	0.6	0.6	0.6	2.4	6.8	4.4	7.3
West Germany	103.1	127.7	142.2	125.2	39.6	35.5	30.4	55.3
All other countries	3.8	3.2	3.3	14.1	26.3	23.5	15.1	53.0

Source: The Swedish Machine Tool and Cutting Tool Manufacturers' Association

Note: Individual items may not add up to totals due to rounding.



SWITZERLAND

Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1985	$ 822.1	$170.0	$ 836.3	$155.8	109.1%	101.7%
1986	1,223.0	312.2	1,260.0	275.2	113.4	103.0
1987	1,652.4	360.1	1,435.8	576.7	62.4	86.9
1988	1,865.0	383.2	1,625.7	622.5	61.6	87.2
1989	1,769.7	426.6	1,556.6	639.7	66.7	88.0
1990	na	585.9	2,016.7	na	na	na

Source: The Swiss Association of Machinery Manufacturers
Note: na – not available

SWITZERLAND

Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$1,260.0	$1,435.8	$1,625.7	$1,556.6	$2,016.7
West Germany	342.8	394.3	356.2	379.4	576.2
France	94.5	113.1	133.2	147.9	214.0
United States	134.4	119.2	112.6	117.6	158.1
Italy	73.0	103.8	128.7	111.8	156.3
USSR	84.9	108.2	169.0	138.2	155.2
Japan	54.0	47.3	66.6	84.4	115.5
United Kingdom	48.8	36.7	53.2	49.5	61.3
Iran	9.2	27.5	29.3	23.0	45.2
Austria	21.2	27.7	31.3	29.4	40.4
Netherlands	19.8	20.3	26.7	20.0	36.0
China	51.8	35.1	45.1	30.8	35.3
South Korea	13.6	21.1	22.4	32.1	34.8
Spain	11.8	19.0	20.3	21.9	31.2
Sweden	26.4	22.5	21.6	24.9	29.8
Czechoslovakia	24.5	27.6	30.1	24.8	26.8
Belgium–Luxembourg	13.8	16.5	18.6	22.6	22.6
Brazil	9.9	10.7	17.9	21.5	20.4
India	19.5	27.2	24.5	16.8	19.2
Denmark	10.7	14.2	9.4	11.7	17.9
Poland	12.6	18.2	23.9	25.2	17.3
East Germany	12.5	48.9	91.0	53.4	16.4
Thailand	2.5	4.8	13.2	7.3	14.4
Taiwan	5.6	12.5	15.3	14.5	13.7
Yugoslavia	15.8	14.4	16.8	13.1	12.4
Bulgaria	42.4	44.4	16.1	24.6	11.6
Singapore	2.9	6.5	9.7	8.6	10.7
Iraq	1.8	9.1	22.3	23.9	10.1
Canada	14.1	13.6	10.1	7.5	6.6
Mexico	5.9	4.9	4.7	6.3	6.6
All other countries	79.7	66.5	85.8	64.0	100.8

Source: The Swiss Association of Machinery Manufacturers

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SWITZERLAND

Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$313.2	$360.1	$383.2	$426.6	$585.9
West Germany	168.1	193.7	195.5	203.6	292.8
Japan	48.7	48.6	61.4	77.0	100.3
Italy	35.0	47.5	42.0	53.8	77.5
France	17.6	18.7	25.3	25.6	30.3
United Kingdom	7.0	7.5	13.3	13.1	19.7
Austria	5.6	5.7	8.3	9.0	11.7
Taiwan	3.9	7.8	4.1	5.6	7.3
Sweden	3.7	3.7	3.9	3.6	7.1
Spain	2.9	4.2	4.2	3.2	5.6
United States	5.3	3.8	5.9	8.1	5.0
Czechoslovakia	2.0	2.4	2.0	2.5	4.5
Netherlands	3.9	3.8	4.4	4.9	4.5
Denmark	1.6	2.3	2.1	3.3	4.4
Belgium–Luxembourg	3.2	2.2	2.2	4.6	3.2
East Germany	0.4	0.5	1.3	0.9	1.4
USSR	1.5	2.3	1.6	2.8	1.4
All other countries	2.8	5.4	5.4	4.9	9.4

Source: The Swiss Association of Machinery Manufacturers

SWITZERLAND

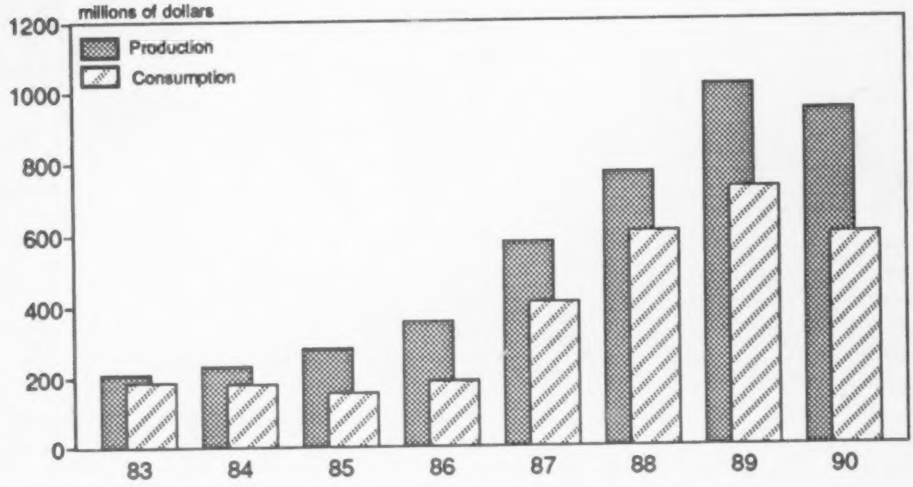
Imports and Exports by Type of Machine

(millions of U.S. dollars)

	EXPORTS			IMPORTS		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	$1,625.7	$1,556.6	$2,016.7	$383.2	$426.6	$585.9
Machining centers	126.7	116.1	152.2	61.4	81.1	120.9
Lathes	206.7	179.4	214.2	89.1	106.9	153.6
Drilling & milling	235.2	192.1	244.9	61.9	67.7	73.0
Grinding machines	321.2	333.1	429.1	40.5	40.8	58.1
Physico–chemical	318.8	319.6	430.6	18.9	12.1	16.6
Metal cutting n.e.c.	99.4	104.2	131.4	23.3	22.9	31.6
Presses	208.1	239.8	324.6	75.6	80.0	115.3
Metal forming n.e.c.	109.5	72.4	89.5	12.6	15.0	17.0

Source: The Swiss Association of Machinery Manufacturers

Note: n.e.c. – not elsewhere classified



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1983	$211.0	$113.0	$135.4	$188.6	59.9%	64.2%
1984	233.2	113.3	164.8	181.7	62.4	70.7
1985	282.2	76.7	202.7	155.5	49.7	72.5
1986	356.7	80.6	248.5	188.8	42.7	69.7
1987	577.8	214.8	381.7	410.9	52.8	66.1
1988	770.0	333.2	496.7	606.6	54.9	64.5
1989	1,016.5	370.5	659.7	727.3	50.9	64.9
1990p	943.7	294.2	640.4	597.5	49.2	67.9

Source: Taiwan Association of Machinery Industry

Note: p – preliminary

Imports by Type of Machine

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	$80.6	$214.8	$333.2	$370.5	$294.2
METAL CUTTING TOTAL	54.8	123.0	165.9	218.0	176.7
Lathes	7.6	15.8	19.4	21.9	20.1
NC lathes	2.1	4.2	9.0	11.2	16.8
Non–NC lathes	5.5	11.6	10.4	10.7	3.3
Drilling machines	5.5	16.4	16.8	9.1	7.1
NC drilling machines	1.2	4.3	6.0	3.1	5.8
Non–NC drilling machines	4.3	12.1	10.8	6.0	1.3
Milling machines	3.8	19.4	21.6	12.8	11.7
NC milling machines	1.4	2.4	3.9	6.0	7.2
Non–NC milling machines	2.4	17.0	17.7	6.8	4.6
Grinding machines	13.5	24.1	32.3	34.4	44.8
NC grinding machines	na	na	0.8	6.4	19.7
Non–NC grinding machines	na	na	31.5	28.0	25.1
Sawing and cut–off machines	0.6	1.2	2.8	6.5	7.7
Shaping, planing, broaching	0.2	0.5	1.0	0.9	1.2
Boring machines	2.0	3.1	6.8	10.1	11.1
NC boring machines	0.3	0.6	1.7	4.1	10.5
Non–NC boring machines	1.7	2.5	5.1	6.0	0.6
Machining centers	3.8	3.4	9.4	41.9	34.6
Gear cutting machines	1.1	7.9	6.5	7.8	8.7
Screw cutting machines	(b)	3.5	6.1	6.6	3.9
EDM	(b)	15.3	19.7	8.4	11.2
Metal cutting n.e.c.	16.7	12.4	23.6	57.5	14.6
METAL FORMING TOTAL	25.8	91.8	167.3	152.5	117.5
Presses and shearing	25.8	31.0	93.8	94.1	75.4
Metal forming n.e.c.	na	60.8	73.5	58.4	42.1

Source: Taiwan Association of Machinery Industry

Note: na – not available, n.e.c. – not elsewhere classified, (b) – included in "metal cutting n.e.c."

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TAIWAN

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	na	na	na	1,928,373	1,031,262	$356.7	$577.8	$770.0	$1,016.5	$943.7
METAL CUTTING TOTAL	na	na	na	1,908,613	1,009,522	326.5	482.5	599.3	791.0	682.8
Lathes	na	na	na	23,963	17,296	74.5	99.2	159.7	229.4	202.2
of which NC	707	1,026	1,365	2,363	2,132	27.2	37.5	61.6	125.3	106.5
Drilling machines	na	na	na	723,060	476,356	67.3	88.9	82.0	82.7	77.4
of which NC	na	76	45	216	285	na	2.0	1.2	1.5	1.4
Milling machines	na	na	na	19,292	16,246	47.8	68.3	85.3	118.2	95.8
of which NC	194	208	190	1,300	977	4.4	7.8	8.1	28.2	20.8
Bench grinders	na	na	na	1,029,762	441,393	na	28.2	33.0	34.5	16.4
Other grinding machines	na	na	na	12,158	8,123	59.8	36.7	49.2	55.9	58.6
of which NC	na	na	na	56	65	na	na	na	3.6	4.2
Sawing & cut-off machines	na	na	na	91,278	41,985	18.6	24.4	33.4	39.7	26.2
Shape, slot, plane	na	na	na	394	246	0.9	1.5	1.6	2.9	2.5
Boring machines	na	na	na	314	26	2.3	5.2	3.3	9.9	6.7
of which NC	na	57	19	30	8	na	2.3	0.2	4.4	1.1
Machining centers	1,016	1,345	1,955	2,042	2,015	40.5	64.9	96.7	130.6	119.8
Special purpose machines	na	na	na	139	292	na	na	na	7.3	15.9
Gear cutting machines	na	na	na	68	170	0.3	0.2	0.1	0.5	1.2
Screw cutting machines	na	na	na	786	592	na	2.1	2.4	4.2	3.5
EDM	na	na	na	3,484	2,817	na	16.2	38.3	47.0	37.8
of which NC	na	na	26	200	152	na	na	1.0	5.4	5.0
Metal cutting n.e.c.	na	na	na	1,873	1,280	14.5	46.7	14.0	28.0	18.7
METAL FORMING TOTAL	na	na	na	19,760	21,740	30.2	95.3	170.7	225.8	260.9
Presses and shearing	na	na	na	13,700	13,536	27.6	47.0	92.7	126.4	121.7
of which NC	na	na	na	51	36	na	na	na	3.4	1.4
Metal forming n.e.c.	na	na	na	6,060	8,204	2.6	48.3	78.0	99.4	139.2

Source: *Taiwan Association of Machinery Industry*

Note: na – not available, n.e.c. – not elsewhere classified

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TAIWAN

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	1,747,986	1,786,752	1,732,877	1,742,060	910,191	$248.5	$381.7	$496.7	$659.7	$640.4
METAL CUTTING TOTAL	1,747,986	1,785,560	1,730,627	1,732,623	898,911	241.8	338.3	429.9	548.9	507.1
Lathes	20,124	17,948	21,156	19,457	14,127	58.7	69.8	111.8	140.0	150.7
of which NC	480	718	751	1,057	1,238	18.5	26.3	33.9	51.7	69.4
Drilling machines	660,400	659,637	670,206	703,000	428,721	53.1	62.5	73.9	80.4	68.4
of which NC	12	78	40	32	86	0.3	2.0	1.1	0.4	0.4
Milling machines	12,324	11,535	12,740	15,713	13,565	33.9	48.0	59.8	81.4	74.3
of which NC	142	166	152	713	586	3.2	6.2	6.5	12.3	10.5
Bench grinders	(b)	1,025,849	946,786	926,786	397,254	(b)	25.5	29.7	31.1	14.7
Other grinding machines	977,076	6,067	6,172	7,658	6,464	43.2	25.8	34.5	39.0	44.5
of which NC	na	na	na	12	17	na	na	na	0.6	1.0
Sawing & cut–off machines	74,058	57,111	63,088	54,100	33,588	13.9	17.1	23.4	28.7	21.0
Shape, plane, slot	113	116	69	86	123	0.8	1.1	1.1	0.8	1.2
Boring machines	36	222	356	191	213	1.5	3.7	2.3	2.9	3.4
Machining centers	847	807	1,173	1,617	1,578	33.0	39.1	58.0	85.1	87.7
Gear cutting machines	25	235	26	36	119	0.1	0.1	(a)	0.3	0.9
Screw cutting machines	na	306	291	459	296	na	1.3	1.5	3.4	1.8
EDM	na	1,017	2,151	2,089	2,223	na	11.4	26.8	34.0	29.2
of which NC	na	na	13	129	91	na	na	0.5	3.6	3.0
Metal cutting n.e.c.	2,587	4,710	6,413	1,431	640	3.6	32.9	7.0	21.4	9.4
METAL FORMING TOTAL	396	1,191	2,250	9,437	11,280	6.7	43.4	66.9	110.9	133.2
Presses and shearing	396	1,191	2,250	6,085	6,768	6.7	9.4	27.8	55.9	60.8
Metal forming n.e.c.	na	na	na	3,352	4,512	na	33.9	39.0	55.0	72.4

Source: Taiwan Association of Machinery Industry

Note: na – not available, n.e.c. – not elsewhere classified, (a) – less than $50,000, (b) – included in "other grinding machines"

TAIWAN

Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$248.5	$381.7	$496.7	$659.7	$640.4
United States	133.6	111.8	130.3	190.5	188.2
Japan	13.9	9.2	19.1	39.3	46.1
Italy	1.8	11.2	20.7	40.4	44.8
West Germany	14.2	21.9	25.4	38.2	42.5
United Kingdom	9.3	19.4	33.8	47.0	33.0
France	8.0	12.9	19.2	24.7	30.9
Hong Kong	7.9	17.0	39.0	29.2	27.2
Thailand	2.7	6.3	21.7	21.1	23.1
Malaysia	(b)	(b)	6.6	11.7	21.1
Singapore	2.2	5.8	12.3	16.8	18.3
Indonesia	2.6	3.2	8.9	11.3	14.3
South Africa	1.3	6.9	19.2	23.4	12.6
South Korea	1.2	7.8	23.1	16.9	12.0
Canada	13.4	22.7	23.7	27.2	12.0
Australia	8.3	13.3	19.0	23.6	9.4
All other countries	28.1	52.9	74.7	98.4	104.9

Source: Taiwan Association of Machinery Industry

Note: (b) – included in "all other countries"
The total for 1987 includes $62 million not classified by country.

TAIWAN

Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$80.6	$214.8	$333.2	$370.5	$294.2
Japan	55.4	139.1	223.0	229.5	183.6
United States	6.4	15.9	33.6	47.6	38.5
West Germany	9.3	14.4	31.7	35.3	32.4
Switzerland	4.2	13.3	14.3	12.9	12.7
Italy	1.2	5.5	10.1	6.5	7.1
United Kingdom	(b)	(b)	4.2	11.2	5.0
Austria	(b)	(b)	3.0	10.6	0.6
All other countries	4.1	12.2	13.4	16.8	14.3

Source: Taiwan Association of Machinery Industry

Note: (b) – included in "all other countries"
The total for 1987 includes $15.3 million not classified by country.

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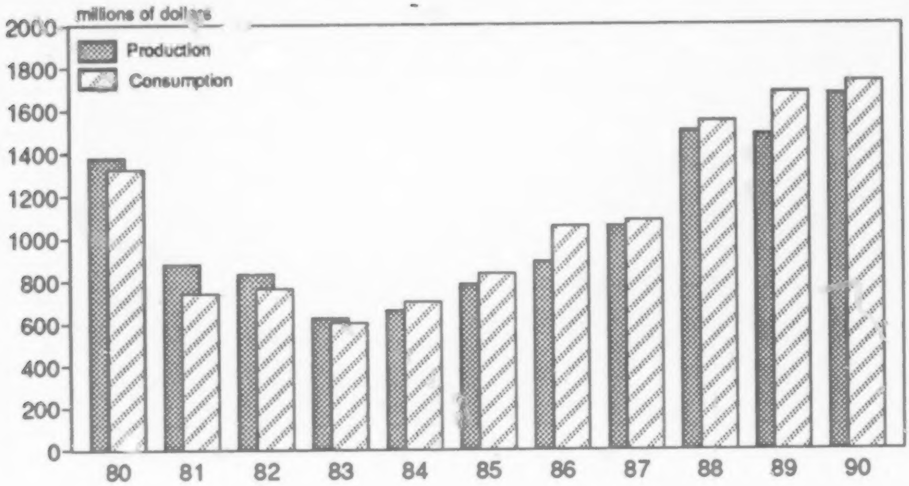

(millions of U.S. dollars)

	Production*	Exports	Imports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1980	$1,379.5	$680.0	$624.4	$1,323.9	47.2%	49.3%	na
1981	880.1	570.6	432.6	742.1	58.3	64.8	32,600
1982	835.0	478.1	409.3	766.2	53.4	57.3	29,800
1983	628.0	319.1	294.1	603.0	48.8	50.8	25,900
1984	664.1	302.4	342.4	704.1	48.6	45.5	23,500
1985	785.6	344.7	394.3	835.2	47.2	43.9	23,800
1986	891.9	394.9	559.1	1,056.1	52.9	44.3	23,400
1987	1,055.5	501.0	529.7	1,084.2	48.9	47.5	23,200
1988	1,501.7	688.0	732.7	1,546.4	47.4	45.8	22,700
1989(r)	1,483.9	653.6	851.5	1,681.8	50.6	44.0	22,100
1990(p)	1,674.0	873.6	932.9	1,733.3	53.8	52.2	20,700

Source: The Machine Tool Technologies Association

Note: * – includes estimates of production by small firms, p – preliminary, r – revised, na – not available

UNITED KINGDOM

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	35,021	58,073	35,196	$686.6	$649.5	$837.7
METAL CUTTING TOTAL	25,778	42,600	25,609	530.7	504.8	678.7
Physico–chemical machines	3,682	16,549	3,927	31.8	32.5	36.3
Wire cut EDM	17	79	62	1.7	3.4	4.1
Other EDM	270	439	291	5.7	6.0	3.8
Other physico–chemical	3,395	16,031	3,574	24.4	23.1	28.4
Machining centers	704	873	1,465	64.5	77.5	147.3
Horizontal	190	287	468	28.8	33.5	58.4
Other	514	586	997	35.7	44.0	88.9
Unit construction machines	66	151	72	3.5	3.2	4.2
Multi–station transfer	157	308	176	16.6	29.0	40.1
Lathes	4,149	4,594	5,475	164.4	134.4	174.3
NC	969	1,098	1,277	102.2	83.1	99.9
Horizontal < 4 tons	447	597	639	24.2	29.5	37.9
Horizontal 4–8 tons	385	367	544	47.6	36.3	53.3
Horizontal > 8 tons	87	69	33	20.2	10.7	4.5
Other	50	65	61	10.2	6.6	4.2
Non–NC	3,180	3,496	4,198	62.2	51.3	74.4
Multi–tool & copying	2,445	2,560	3,565	29.5	25.1	39.9
Center	100	168	240	2.0	2.1	2.8
Automatic	184	210	152	18.0	13.1	19.6
Other	451	558	241	12.7	11.0	12.1
Way type unit heads	44	82	198	4.5	7.8	3.9
Drilling machines	2,445	2,386	2,603	17.6	8.1	34.7
of which NC	70	119	427	2.7	0.8	24.9
Boring–milling machines	257	274	452	20.4	23.5	35.4
of which NC	45	94	98	11.6	18.9	25.2
Boring machines	757	1,442	190	9.7	7.7	6.0
of which NC	12	36	19	2.0	0.9	1.6
Milling machines	1,952	2,056	1,326	47.8	36.2	28.9
NC knee type	191	185	197	10.9	6.7	7.6
Non–NC knee type	1,029	997	497	15.3	12.1	6.7
Other NC milling	137	229	233	10.1	9.3	9.4
Other non–NC milling	595	645	399	11.5	8.1	5.2
Threading & tapping	237	534	356	6.7	7.5	5.1

(continued)

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Exports by Type of Machine[1]
(continued)

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
Grinding & other abrasive	3,977	3,700	3,850	$ 87.6	$ 75.2	$ 97.7
NC	164	222	175	32.7	21.7	29.0
Flat surface	41	96	83	3.1	5.6	12.4
Other	123	126	92	29.6	16.1	16.6
Non–NC	3,566	3,266	3,453	49.0	49.6	64.6
Flat surface	738	916	1,131	13.8	15.0	17.8
Cylindrical	389	633	460	14.4	22.9	30.1
Thread & gear	41	44	31	5.7	2.4	3.2
Other	2,398	1,673	1,831	15.1	9.3	13.5
Honing & lapping	247	212	222	5.9	3.9	4.1
Shaping or slotting	78	144	139	2.4	1.5	2.4
Broaching machines	25	50	51	0.3	9.2	16.0
Gear cutting machines	626	498	196	13.6	8.1	7.2
NC	19	4	6	2.5	1.6	0.7
Non–NC	607	494	190	11.1	6.5	6.5
Sawing & cut–off	2,566	2,550	1,561	11.8	7.7	8.9
Used metal cutting mach.	3,030	3,438	2,477	24.1	28.7	19.2
Metal cutting n.e.c.	1,026	2,971	1,095	3.5	7.0	10.8
METAL FORMING TOTAL	9,243	15,473	9,587	155.9	144.7	159.0
Forging or die–stamping	280	975	699	13.0	23.4	14.9
of which NC	3	13	39	0.3	0.5	3.9
Bend, fold, str., etc.	2,333	4,065	2,170	52.4	53.2	58.2
of which NC	242	312	286	12.1	8.5	13.9
Shearing machines	748	1,217	1,762	15.8	10.3	21.3
of which NC	27	66	27	2.0	0.7	0.6
Punching or notching	622	919	630	10.7	9.3	17.6
of which NC	79	145	91	5.2	4.2	6.8
Presses	1,148	2,653	1,882	27.5	21.6	24.2
NC	28	14	9	6.3	6.6	1.0
Non–NC hydraulic	224	328	305	4.8	5.9	5.4
Non–NC other	896	2,311	1,568	16.4	9.1	17.8
Draw benches for bars, etc.	172	164	301	9.3	6.2	5.9
Machines for working wire	1,002	1,057	769	12.3	5.9	7.6
Metal forming n.e.c.	2,938	4,423	1,374	14.9	14.8	9.4

Source: Machine Tool Technologies Association

Note: n.e.c. = not elsewhere classified

[1] This chart excludes some low value items which were possibly misclassified as machine tools in U.K. export data.

UNITED KINGDOM

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	50,622	62,232	35,230	$723.8	$844.0	$889.1
METAL CUTTING TOTAL	29,622	42,280	19,663	496.0	603.2	637.9
Physico–chemical machines	1,547	2,652	1,795	42.0	37.1	51.6
Wire cut EDM	213	180	218	20.2	12.5	15.0
Other EDM	272	264	407	5.3	5.3	10.0
Other physico–chemical	1,062	2,208	1,170	16.5	19.3	26.6
Machining centers	723	774	1,268	70.9	99.0	107.2
Horizontal	169	359	422	31.2	55.6	50.8
Other	554	415	846	39.7	43.4	56.5
Unit construction machines	23	40	66	6.8	6.2	7.5
Multi–station transfer	76	368	478	14.1	63.5	107.3
Lathes	2,414	2,772	1,972	140.7	154.2	144.6
NC	1,195	1,419	1,286	111.9	132.0	124.2
Horizontal < 4 tons	549	619	516	36.2	43.1	31.7
Horizontal 4–8 tons	388	473	502	37.4	47.2	49.1
Horizontal > 8 tons	133	142	141	25.9	24.9	30.6
Other	125	185	127	12.4	16.8	12.8
Non–NC	1,219	1,353	686	28.8	22.2	20.4
Multi–tool & copying	399	642	356	5.9	5.8	6.1
Center	92	197	70	2.8	1.9	1.3
Automatic	189	219	49	8.2	4.1	3.5
Other	539	295	211	11.9	10.4	9.5
Way type unit heads	12	17	40	1.2	1.8	2.0
Drilling machines	1,933	3,675	1,955	14.2	15.6	17.5
of which NC	106	97	95	7.8	7.8	9.6
Boring–milling machines	380	225	272	16.8	18.3	18.9
of which NC	94	78	117	10.9	12.4	11.1
Boring machines	415	486	88	3.7	8.9	3.2
of which NC	9	37	6	0.7	6.1	0.6
Milling machines	2,890	3,558	1,307	47.2	44.9	33.3
NC knee type	10	9	10	1.5	1.3	0.7
Non–NC knee type	504	469	391	4.4	4.3	3.3
Other NC milling	290	276	265	25.2	17.7	21.3
Other non–NC milling	2,086	2,804	641	16.1	21.6	8.0
Threading & tapping	1,119	1,546	549	6.4	5.9	5.3

(continued)

UNITED KINGDOM

Imports by Type of Machine[1] *(continued)*

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
Grinding & other abrasive	2,863	4,915	2,185	$ 65.0	$ 65.8	$ 72.9
NC	164	240	253	25.8	38.8	38.3
Flat surface	34	42	80	3.6	5.6	7.3
Other	130	198	173	22.2	33.2	31.0
Non–NC	2,639	4,564	1,837	36.1	22.2	31.5
Flat surface	588	780	339	8.8	7.0	8.0
Cylindrical	214	370	218	10.2	8.6	9.0
Thread & gear	32	12	15	1.6	1.0	1.2
Other	1,805	3,402	1,265	15.5	5.6	13.3
Honing & lapping	60	111	95	3.1	4.8	3.1
Shaping or slotting	43	107	177	1.2	2.5	1.1
Broaching machines	12	27	154	1.4	0.8	10.0
Gear cutting machines	387	395	217	16.2	14.2	12.6
NC for cylind. gears	52	5	7	3.4	2.0	3.7
NC for other gears	3	2	–	1.4	0.7	–
NC gear finishing	13	5	2	4.6	0.7	1.4
Non–NC gear cutting	319	383	208	6.8	10.8	7.5
Sawing & cut–off	11,140	12,998	3,708	25.1	24.0	22.0
Used metal cutting mach.	781	1,122	762	13.5	14.9	8.1
Metal cutting n.e.c.	2,864	6,603	2,882	9.9	14.9	12.8
METAL FORMING TOTAL	21,000	19,952	15,567	227.8	240.8	251.1
Forging or die–stamping	273	326	628	10.0	13.5	21.4
of which NC	11	5	9	2.6	1.0	1.6
Bend, fold, str., etc.	3,601	4,499	2,007	45.0	43.8	39.3
of which NC	222	408	344	13.7	15.7	14.2
Shearing machines	3,843	2,807	994	30.8	56.0	32.9
of which NC	94	55	245	6.0	2.1	12.0
Punching or notching	1,309	948	1,096	38.2	37.1	44.3
of which NC	190	230	430	26.3	29.7	31.0
Presses	2,323	4,885	4,585	59.9	52.8	81.1
NC	43	41	41	30.7	16.9	34.1
Non–NC hydraulic	657	1,292	510	11.3	16.4	13.4
Non–NC other	1,623	3,552	4,034	17.9	19.5	33.6
Draw benches for bars, etc.	129	244	119	5.8	7.5	2.2
Thread rolling machines	47	31	19	0.9	0.7	0.5
Machines for working wire	447	646	447	7.7	12.2	11.3
Metal forming n.e.c.	9,075	5,597	5,691	30.4	17.8	18.6

Source: Machine Tool Technologies Association

Note: n.e.c. = not elsewhere classified

[1] This chart excludes some low value items which were possibly misclassified as machine tools in U.K. import data.

UNITED KINGDOM

Exports by Destination

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL EXPORTS	$394.9	$501.0	$688.0	$653.6	$873.6
United States	94.5	97.3	110.8	106.7	136.9
West Germany	44.9	52.7	72.0	76.9	133.4
Belgium	7.6	21.1	32.8	57.9	85.7
France	27.5	34.5	55.6	43.9	71.2
Italy	16.0	24.7	36.9	34.6	44.9
USSR	3.2	14.8	14.6	10.8	32.6
Sweden	10.7	18.4	13.8	16.6	28.6
Ireland	8.7	11.8	15.3	21.8	22.5
Spain	6.1	29.4	22.4	23.9	21.5
Switzerland	10.5	11.1	14.1	14.3	18.8
South Africa	4.2	8.4	17.3	14.9	16.5
India	13.0	9.6	9.9	9.0	15.5
Australia	11.6	15.0	16.6	20.3	12.2
Canada	17.2	23.7	14.8	11.8	12.1
Iraq	1.6	4.7	56.1	20.3	8.5
China	18.2	10.2	18.0	15.6	5.8
Egypt	2.5	5.3	10.3	13.8	3.9
All other countries	96.9	108.3	156.7	140.4	203.0

Source: The Machine Tool Technologies Association

UNITED KINGDOM

Imports by Country of Origin

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
TOTAL IMPORTS	$559.1	$529.7	$732.7	$851.5	$932.9
West Germany	164.5	182.2	185.6	187.9	239.9
Japan	107.2	115.1	182.8	206.8	213.4
United States	74.0	43.6	85.3	147.9	131.2
Switzerland	45.7	36.8	50.1	39.8	55.3
Italy	33.8	25.7	38.1	46.9	50.0
Canada	29.7	0.9	1.0	18.0	44.2
Taiwan	10.7	21.4	31.0	41.3	33.9
France	12.9	13.3	27.1	26.2	32.2
Sweden	18.6	16.6	25.3	21.2	20.4
Belgium–Luxembourg	5.6	13.4	14.3	11.6	18.6
Spain	12.7	12.0	15.1	11.8	12.8
Netherlands	6.2	6.4	15.3	15.6	11.6
Austria	4.8	10.7	9.8	19.8	6.2
Denmark	2.3	6.4	5.9	5.2	5.1
Ireland	2.3	2.4	4.1	5.7	3.5
All other countries	28.1	22.8	41.9	45.6	54.6

Source: The Machine Tool Technologies Association

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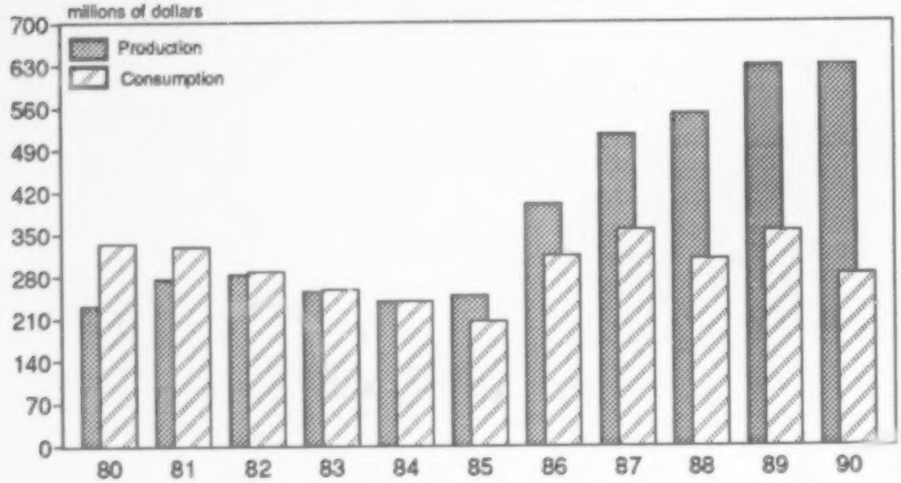

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1979	$189.2	$192.8	$54.3	$327.7	58.8%	28.7%
1980	231.8	186.7	83.8	335.2	55.7	35.9
1981	276.7	131.0	77.8	329.9	39.7	28.1
1982	284.5	140.3	136.4	288.4	48.7	47.9
1983	255.0	137.9	134.6	258.3	53.3	52.8
1984	239.2	125.4	125.2	239.0	52.5	52.5
1985	247.9	99.9	142.7	205.1	48.7	57.6
1986	399.4	143.3	219.4	314.3	45.6	56.2
1987	515.0	145.0	303.4	356.6	40.7	58.9
1988	550.0	152.0	393.6	308.4	49.3	71.6
1989	630.0	125.3	401.2	354.1	35.5	63.7
1990	630.0	118.0	464.6	283.4	41.6	73.7

Source: Yugoslav Machine Tool Builders' Association

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INTERNATIONAL MANUFACTURING TECHNOLOGY SHOW

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UNITED KINGDOM

Production[1]

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL[1]	na	na	na	na	na	$530.5	$609.6	$868.1	$923.4	$1,001.8
NC MACHINE TOOL TOTAL**	na	na	na	na	na	254.1	291.2	481.5	565.2	642.7
Physico–chemical machines	na	na	na	na	261	na	na	na	(a)	12.8
Horiz. machining centers	156	131	179	260	229	33.3	44.9	52.0	74.0	73.4
cube size < 400 mm	na	na	na	132	129	na	na	na	25.6	27.8
cube size > 400 mm	na	na	na	128	100	na	na	na	48.4	45.5
Vert. machining centers	912	756	1,028	1,303	1,549	68.8	73.6	123.8	104.9	135.8
x axis < 650 mm	na	na	na	597	560	na	na	na	39.7	37.5
x–axis > 650 mm	na	na	na	706	989	na	na	na	65.3	98.0
Other multi–function***	1,043	830	911	na	na	36.8	44.0	49.5	–	–
Lathes	895	na	666	1,482	1,493	51.2	30.2	48.3	140.1	138.0
w/chuck < 210 mm	572	145	na	939	1,051	30.4	10.7	na	75.3	88.9
w/chuck > 210mm	323	na	na	543	442	20.8	19.5	na	64.8	49.1
Drilling machines	na	na	na	na	na	(c)	(c)	(c)	3.4	7.0
Grinding machines	na	na	na	203	217	(c)	(c)	(c)	71.8	85.3
Milling machines	na	na	na	1,011	722	(c)	(c)	(c)	64.1	76.4
NC machines n.e.c.	na	na	na	na	na	64.0	98.5	208.1	105.4	98.3
NON–NC METAL CUTTING TOTAL	na	na	na	na	na	209.7	226.3	272.6	230.5	222.4
Physico–chemical machines	na	na	na	na	na	9.4	15.6	19.4	18.7	13.4
Grinding machines	na	na	na	na	4,419	51.3	44.1	55.0	26.7	25.9
Cylindrical	280	208	na	na	na	20.8	16.1	17.8	na	na
Surface	na	513	512	na	na	10.9	11.8	15.5	na	na
Other	1,698	na	2,490	na	na	19.7	16.2	21.7	na	na

(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Boring, boring–milling	91	93	na	na	na	$ 7.0	$ 3.4	(a)	(b)	$ 12.5
Milling machines	1,447	na	2,378	na	714	18.8	22.0	24.9	24.9	18.2
Lathes	6,688	na	na	5,275	5,744	59.6	56.9	80.3	73.0	93.2
Drilling machines	638	710	582	na	1,027	3.8	3.8	6.9	11.8(e)	4.8
Unit const. & transfer machines	na	na	na	na	na	33.2	62.3	61.3	56.4	36.8
Sawing & cut–off machines	5,558	6,210	na	na	na	13.1	6.9	(a)	15.6	14.8
Metal cutting n.e.c.	na	na	na	na	na	13.5	11.3	24.8	3.9	2.7
NON–NC METAL FORMING TOTAL	na	na	na	na	na	66.7	92.1	114.0	127.7	136.7
Bending & forming machines	(d)	na	na	125	284	na	na	na	43.1	46.6
Forging machines	826	na	na	na	31	4.8	3.3	3.4	(d)	2.1
Presses	na	na	na	660	534	na	na	na	37.4	44.1
Punching & shearing machines	(d)	na	na	na	na	(d)	(d)	15.0	25.9	29.1
Metal forming n.e.c.	821	na	na	na	538	42.0	43.9	51.8	21.0	14.8
Metal cutting parts & access.	–	–	–	–	–	126.5	138.2	171.2	177.1	193.8
Metal forming parts & access.	–	–	–	–	–	32.4	36.2	38.5	47.6	43.9

Source: United Kingdom Department of Trade and Industry

Note: [1]Data only cover firms with at least 35 employees (50 in 1986), ** – does not include NC physico–chemical machines before 1989, *** – multi–function (drilling and milling and boring) with line motion or contouring control system with manual tool change or indexing turret, na – not available, n.e.c. – not elsewhere classified, (a) – included in "metal cutting n.e.c.," (b) – included in "drilling machines," (c) – included in "NC machines n.e.c.," (d) – included in "non–NC metal forming n.e.c.," (e) – includes "boring and boring–milling machines"

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ECONOMIC STATISTICS

Business Cycle Reference Dates

Expansion	Duration in Months	Recession	Duration in Months
Oct. 1945 – Nov. 1948	37	Nov. 1948 – Oct. 1949	11
Oct. 1949 – July 1953	45 (a)	July 1953 – May 1954	10
May 1954 – Aug. 1957	39	Aug. 1957 – Apr. 1958	8
Apr. 1958 – Apr. 1960	24	Apr. 1960 – Feb. 1961	10
Feb. 1961 – Dec. 1969	106 (a)	Dec. 1969 – Nov. 1970	11
Nov. 1970 – Nov. 1973	36	Nov. 1973 – Mar. 1975	16
Mar. 1975 – Jan. 1980	58	Jan. 1980 – July 1980	6
July 1980 – July 1981	12	July 1981 – Nov. 1982	16
Nov. 1982 – July 1990	92	July 1990 –	

Source: National Bureau of Economic Research, Inc.

Note: (a) – Wartime expansion
The historical business cycle turning dates, above, are designated by the National Bureau of Economic Research, Inc. (NBER). They mark the approximate dates when, according to the NBER, aggregate economic activity reached its cyclical high (peak) or low (trough).

ECONOMIC STATISTICS

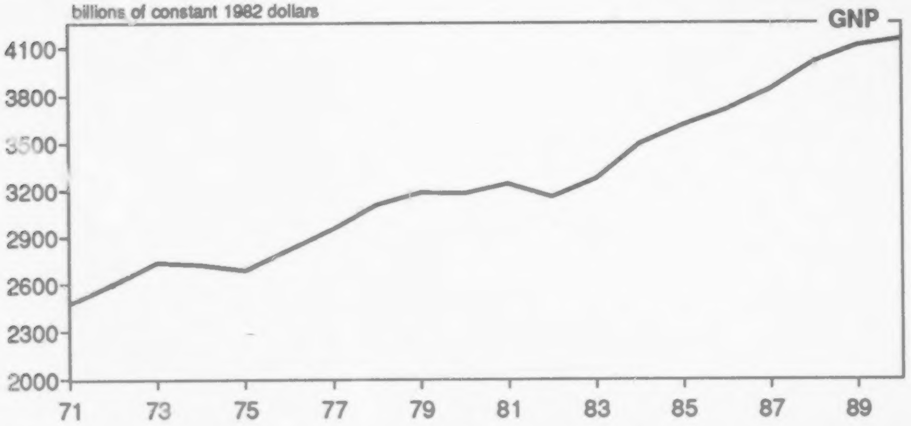
Selected Leading Business Cycle Indicators

(billions of dollars)

Year	Index of Leading Economic Indicators (1982 = 100)	Average Workweek Manufacturing (Hours)	Contracts and Orders for Plant and Equipment	New Orders Consumer Goods and Materials	Change in Mfrs Unfilled Orders, Durable Goods
1971	83.3	39.9	$258.15	$783.76	$–1.12
1972	92.3	40.5	283.17	881.36	1.29
1973	97.2	40.7	351.06	979.67	5.13
1974	89.0	40.0	350.99	907.00	1.92
1975	84.5	39.5	265.85	778.64	–5.12
1976	96.2	40.1	297.35	889.93	–0.85
1977	101.0	40.3	327.41	986.07	0.90
1978	104.6	40.4	380.52	1,042.19	3.74
1979	103.6	40.2	407.10	1,019.17	2.72
1980	99.2	39.7	361.33	909.28	–1.06
1981	101.2	39.8	351.96	906.61	–1.09
1982	100.0	38.9	309.54	837.01	–2.34
1983	116.2	40.1	317.13	933.73	1.13
1984	121.7	40.7	379.83	1,016.11	2.31
1985	124.1	40.5	410.23	1,022.50	0.03
1986	132.2	40.7	413.40	1,043.05	–0.08
1987	140.0	41.0	474.17	1,096.43	1.37
1988	142.7	41.1	540.57	1,118.85	1.83
1989	144.9	41.0	591.18	1,127.06	2.01
1990	143.9	40.8	540.35	1,106.31	0.76

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Gross National Product and Components

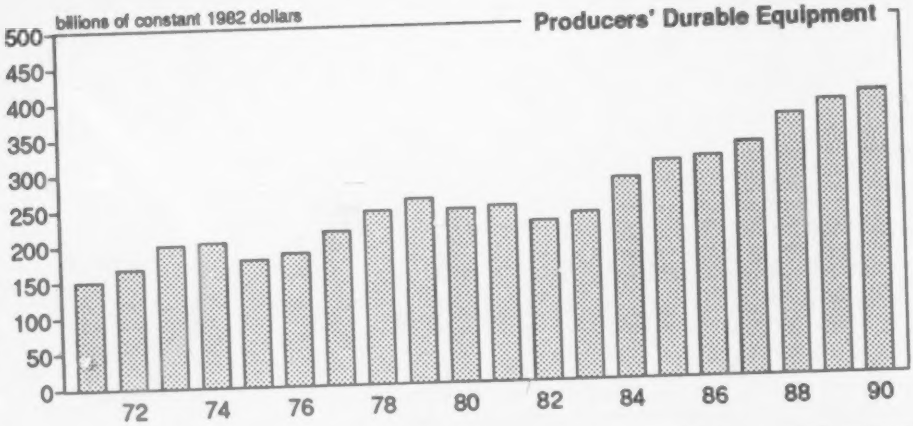


Year	Gross National Product	Personal Consumption Expenditures	Gross Private Domestic Investment	Net Exports of Goods and Services	Government Purchases of Goods and Services
		Current Dollars (billions)			
1986	$4,231.6	$2,797.4	$659.4	$ –97.4	$ 872.2
1987	4,515.6	3,009.4	699.5	–114.7	921.4
1988	4,873.7	3,238.2	747.1	–74.1	962.5
1989(r)	5,200.8	3,450.1	771.2	–46.1	1,025.6
1990(p)	5,465.1	3,657.3	741.0	–31.2	1,098.1
		Constant 1982 Dollars (billions)			
1971	$2,484.8	$1,538.8	$419.3	$ –39.8	$ 566.5
1972	2,608.5	1,621.9	465.4	–49.4	570.7
1973	2,744.1	1,689.6	520.8	31.5	565.3
1974	2,729.3	1,674.0	481.3	0.8	573.2
1975	2,695.0	1,711.9	383.3	18.9	580.9
1976	2,826.7	1,803.9	453.5	–11.0	580.3
1977	2,958.6	1,883.8	521.3	–35.5	589.1
1978	3,115.2	1,961.0	576.9	–26.8	604.1
1979	3,192.4	2,004.4	575.2	3.6	609.1
1980	3,187.1	2,000.4	509.3	57.0	620.5
1981	3,248.8	2,024.2	545.5	49.4	629.7
1982	3,166.0	2,050.7	447.3	26.3	641.7
1983	3,279.1	2,146.0	504.0	–19.9	649.0
1984	3,501.4	2,249.3	658.4	–84.0	677.7
1985	3,618.7	2,354.8	637.0	–104.3	731.2
1986(r)	3,717.9	2,446.4	639.6	–129.7	761.6
1987(r)	3,845.3	2,515.8	669.0	–118.5	779.1
1988(r)	4,016.9	2,606.5	705.7	–75.9	780.5
1989(r)	4,117.7	2,656.8	716.9	–54.1	798.1
1990(p)	4,157.3	2,681.6	688.7	–33.8	820.8

Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 1.1 and 1.2

p – preliminary, r – revised, na – not available, E – estimated, D – not disclosed

Gross National Product and Private Investment



Year	Gross National Product	Gross Private Fixed Nonresidential Domestic Investment			
		Total		Producers' Durable Equipment	
		Billions $	% of GNP	Billions $	% of GNP
		Current Dollars (billions)			
1986	$4,231.6	$435.29	10.3%	$296.2	7.0%
1987	4,515.6	444.9	9.9	311.2	6.9
1988	4,873.7	488.4	10.0	348.4	7.1
1989(r)	5,200.8	511.9	9.8	365.7	7.0
1990(p)	5,465.1	524.1	9.6	377.1	6.9
		Constant 1982 Dollars (billions)			
1971	$2,484.8	$258.4	10.4%	$151.0	6.1%
1972	2,608.5	277.0	10.6	167.5	6.4
1973	2,744.1	317.3	11.6	199.6	7.3
1974	2,729.3	317.8	11.6	202.7	7.4
1975	2,695.9	281.2	10.4	178.4	6.6
1976	2,826.7	290.6	10.3	186.2	6.6
1977	2,958.6	324.0	11.0	215.7	7.3
1978	3,115.2	362.1	11.6	242.8	7.8
1979	3,192.4	389.4	12.2	258.8	8.1
1980	3,187.1	379.2	11.9	243.0	7.6
1981	3,248.8	395.2	12.2	246.4	7.6
1982	3,166.0	366.7	11.6	223.4	7.1
1983	3,279.1	361.2	11.0	233.9	7.1
1984	3,501.4	425.2	12.1	281.4	8.0
1985	3,618.7	453.5	12.5	304.0	8.4
1986(r)	3,717.9	438.4	11.8	308.3	8.3
1987(r)	3,845.3	449.8	11.7	327.0	8.5
1988(r)	4,016.9	487.2	12.1	364.8	9.1
1989(r)	4,117.7	506.1	12.3	383.7	9.3
1990(p)	4,157.3	515.4	12.4	394.6	9.5

Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 1.1 and 1.2

Note: Gross private fixed nonresidential domestic investment includes capital expenditures by the domestic business sector for (1) new and replacement construction (e.g., buildings, stores and warehouses) and (2) producers' durable equipment. Expenditures for producers' durable equipment include the new and replacement purchases of automobiles, trucks, various types of machinery, and other equipment used by the private sector in the production of goods and services.

p – preliminary, r – revised, na – not available, E – estimated, D – not disclosed

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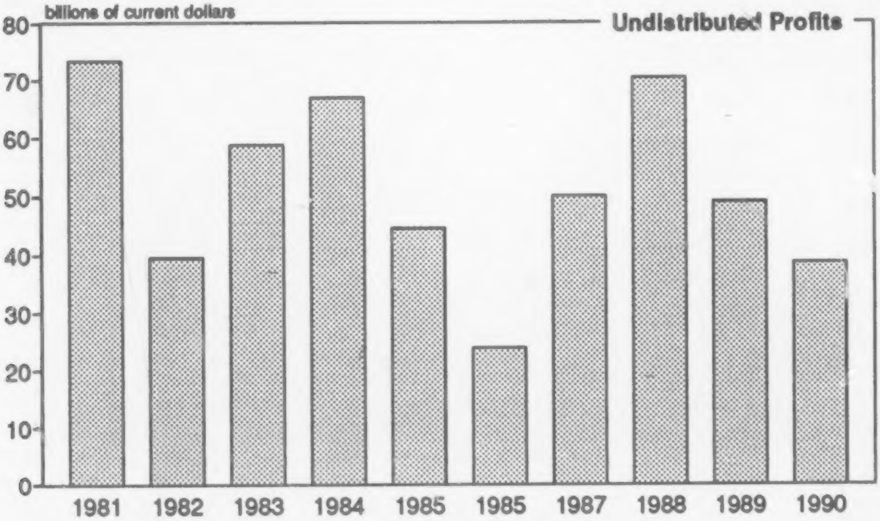
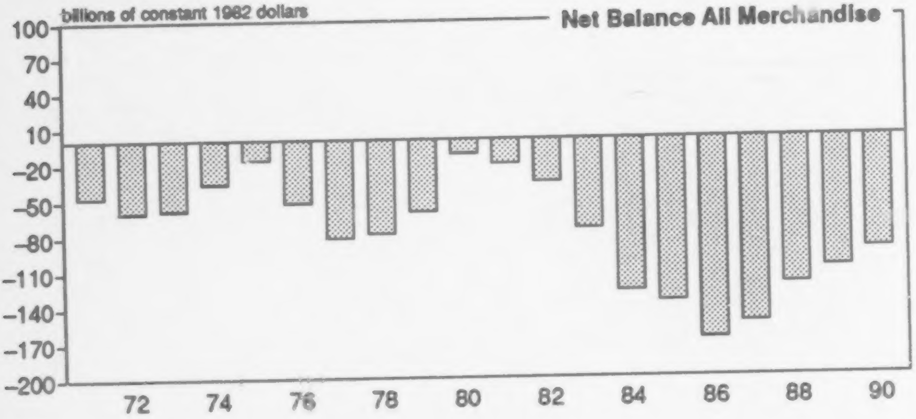


Year	Corporate Profits Before Taxes	Profits Tax Liability	Profits After Tax	Net Dividend Payments	Undistributed Profits
			Current Dollars (billions)		
1981	$221.2	$81.1	$140.0	$66.5	$73.5
1982	169.5	63.1	106.5	66.9	39.6
1983	207.6	77.2	130.4	71.5	58.9
1984	240.0	93.9	146.1	79.0	67.0
1985	224.3	96.4	127.8	83.3	44.6
1986(r)	221.6	106.3	115.3	91.3	24.0
1987(r)	275.3	126.9	148.4	98.2	50.2
1988(r)	316.7	136.2	180.5	110.0	70.5
1989(r)	307.7	135.1	172.6	123.5	49.1
1990(p)	304.7	132.1	172.5	133.9	38.7

Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Table 1.14

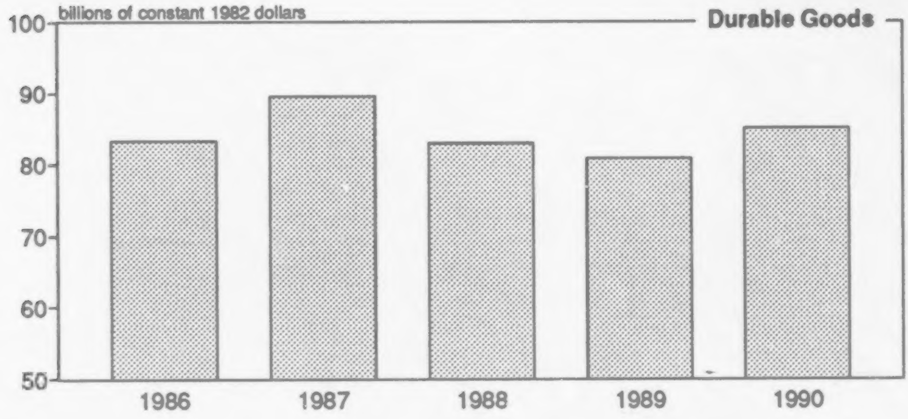


Year	All Merchandise			Capital Goods, except Autos		
	Exports	Imports	Net Balance	Exports	Imports	Net Balance
			Current Dollars (billions)			
1986	$224.4	$367.8	$–143.4	$ 79.3	$ 72.1	$ 7.2
1987	256.0	412.6	–156.6	92.4	85.1	7.3
1988	324.2	450.1	–125.9	119.0	102.2	16.8
1989(r)	369.9	480.9	–111.0	138.0	113.1	24.9
1990(p)	397.9	502.7	–104.8	153.5	117.2	36.3
			Constant 1982 Dollars (billions)			
1971	119.3	166.2	–46.9	36.8	8.5	28.3
1972	131.3	190.7	–59.4	39.7	10.9	28.8
1973	160.6	218.2	–57.6	50.3	13.5	36.8
1974	175.8	211.8	–36.0	61.9	14.4	47.5
1975	171.5	187.9	–16.4	62.7	13.5	49.2
1976	177.5	229.3	–51.8	61.1	16.2	44.9
1977	178.1	259.4	–81.3	58.8	17.2	41.6
1978	196.2	274.1	–77.9	64.6	22.3	42.3
1979	218.2	277.9	–59.7	76.3	27.4	48.9
1980	241.8	253.6	–11.8	87.1	31.2	55.9
1981	238.5	258.7	–20.2	86.6	36.8	49.8
1982	214.0	249.5	–35.5	73.7	38.3	35.4
1983	207.6	282.2	–74.6	70.8	45.7	25.1
1984	223.8	351.1	–127.3	78.6	69.3	9.3
1985	231.6	367.9	–136.3	85.8	73.1	12.7
1986	245.9	413.7	–167.8	94.1	84.1	10.0
1987	286.5	440.9	–154.4	119.3	102.4	16.9
1988	347.3	469.4	–122.1	154.7	122.5	32.2
1989(r)	390.8	499.3	–108.5	176.4	143.7	32.7
1990(p)	423.9	517.0	–93.1	198.8	156.4	42.4

Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 4.3 and 4.4

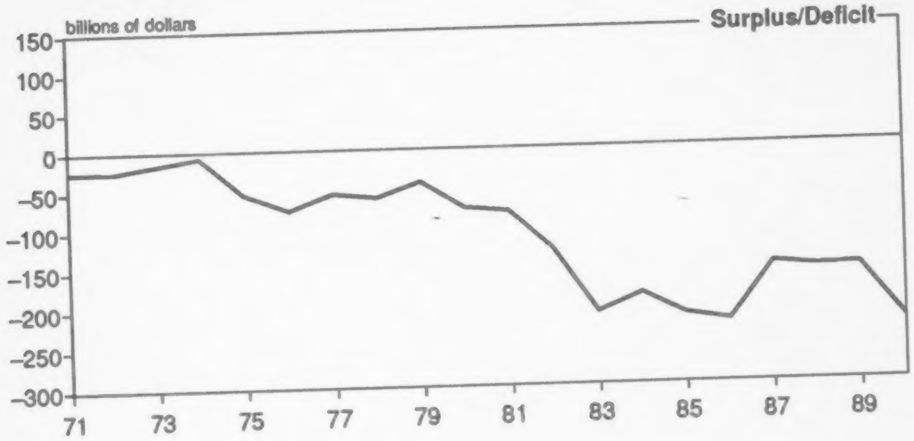
p – preliminary, r – revised, na – not available, E – estimated, D – not disclosed

National Defense Purchases of Durable Goods



Category	1986	1987	1988	1989	1990
Current Dollars (billions)					
National Defense Purchases	$277.8	$294.6	$297.2	$301.1	$313.6
Durable Goods	83.3	89.6	83.0	80.9	85.1
Military Equipment	71.1	77.5	72.4	71.6	75.8
Aircraft	33.0	33.9	29.2	26.6	26.6
Missiles	11.4	12.6	12.1	13.0	15.1
Ships	8.5	8.5	8.4	9.9	10.8
Vehicles	4.7	4.8	4.2	3.6	3.6
Electronic Equipment	5.1	5.8	6.0	6.4	6.1
Other	8.4	11.7	12.4	12.2	13.5
Other Durable Goods	12.2	12.2	10.7	9.3	9.4
Constant 1982 Dollars (billions)					
National Defense Purchases	$252.1	$265.1	$260.7	$256.3	$258.7
Durable Goods	78.4	88.7	83.8	81.5	84.5
Military Equipment	64.1	73.3	70.2	69.6	72.1
Aircraft	27.9	31.6	28.8	26.8	26.3
Missiles	11.0	12.7	12.8	14.5	16.3
Ships	7.5	7.4	7.1	7.9	8.4
Vehicles	5.0	5.2	4.6	3.9	3.9
Electronic Equipment	4.8	5.5	5.6	5.8	5.5
Other	8.0	11.0	11.3	10.6	11.5
Other Durable Goods	14.3	15.4	13.6	11.9	12.5

Source: U. S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 3.9 and 3.10



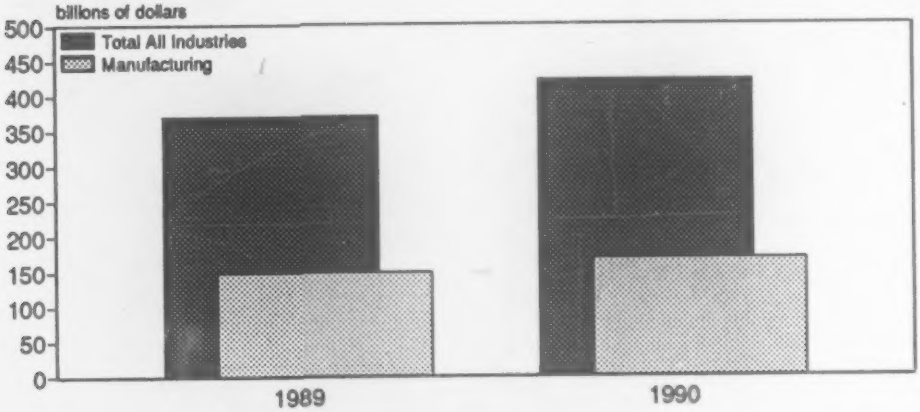
Fiscal Years
(billions of dollars)

Year	Receipts	Outlay	Surplus or Deficit (–)
1971	$187.1	$210.2	–23.0
1972	207.3	230.7	–23.4
1973	230.8	245.7	–14.9
1974	263.2	269.4	–6.1
1975	279.1	332.3	–53.2
1976	298.1	371.8	–73.7
Tr. Qtr.	81.2	96.0	–14.7
1977	355.6	409.2	–53.6
1978	399.6	458.7	–59.2
1979	463.3	503.5	–40.2
1980	517.1	590.9	–73.8
1981	599.3	678.2	–78.9
1982	617.8	745.7	–127.9
1983	600.6	808.3	–207.8
1984	666.5	851.8	–185.3
1985	734.1	946.3	–212.3
1986	769.1	990.3	–221.2
1987	854.1	1,003.8	–149.7
1988(r)	909.0	1,064.1	–155.1
1989(r)	990.7	1,144.1	–153.4
1990(p)	1,031.3	1,251.7	–220.4

Source: "Economic Report of the President," February 1991

Note: Tr. Qtr. – Transition Quarter: Beginning with the 1977 Federal Budget, the fiscal year runs from October 1 through September 30. To facilitate the conversion, a three–month transition period was provided between fiscal years 1976 and 1977.

Value of Direct Investments
United States → Abroad



On a Historical–Cost Basis at Year End

(millions of U.S. dollars)

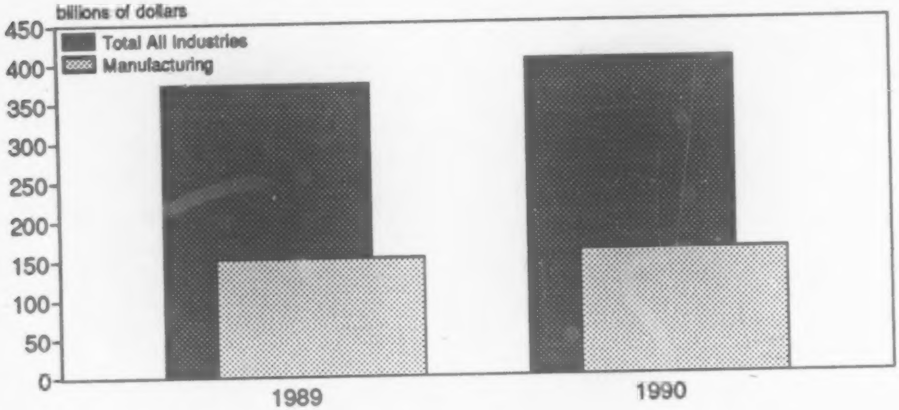
	Total All Industries		Manufacturing	
	1989 (r)	1990 (p)	1989 (r)	1990 (p)
World	$370,091	$421,494	$149,237	$168,220
Canada	65,548	68,431	31,593	33,231
Europe	175,213	204,204	72,842	83,992
European Community (12):	149,545	172,940	70,919	81,264
Belgium	7,941	9,462	4,041	4,331
France	14,069	17,134	9,085	11,051
Germany	24,550	27,715	15,784	17,489
Italy	10,294	12,971	6,639	8,535
Netherlands	18,133	22,778	6,845	8,144
Spain	6,096	7,480	3,952	4,998
United Kingdom	59,827	64,983	19,087	20,636
Other EC	8,635	10,417	5,486	6,080
Other Europe	25,668	31,264	1,923	2,729
Japan	18,488	20,994	9,721	10,623
Australia, New Zealand, & South Africa	15,314	18,557	6,158	6,812
Australia	13,331	14,529	5,447	6,060
New Zealand & South Africa	1,983	4,028	711	752
Latin America and Other Western Hemisphere	62,727	72,467	21,183	23,802
South America	23,612	24,920	14,247	15,242
Brazil	14,522	15,416	10,655	11,286
Other South America	9,090	9,504	3,592	3,956
Cental America	16,050	18,911	6,635	8,171
Mexico	7,280	9,360	5,853	7,314
Other Central America	8,770	9,551	782	857
Other Western Hemisphere	23,065	28,636	302	389
Other Africa	3,993	3,780	355	416
Middle East	4,166	4,755	744	911
Other Asia and Pacific	21,212	24,719	6,641	8,433

Source: U.S. Department of Commerce, "Survey of Current Business" (June 1991)

Note: Historical cost reflects book value and does not necessarily reflect current market value of investments.

G

Value of Direct Investments
Foreign → United States



On a Historical–Cost Basis at Year End

(millions of U.S. dollars)

	Total All Industries		Manufacturing	
	1989 (r)	1990 (p)	1989 (r)	1990 (p)
World	$373,763	$403,735	$151,820	$159,998
Canada	28,686	27,733	9,934	9,327
Europe	242,961	256,496	120,132	125,568
European Community (12):				
France	16,822	19,550	11,355	14,692
Germany	29,015	27,770	15,722	15,216
Netherlands	56,316	64,333	23,709	24,446
United Kingdom	105,511	108,055	51,798	52,955
Other Europe:				
Sweden	5,303	5,450	3,783	4,938
Switzerland	18,772	17,512	10,412	9,113
Latin America and Other Western Hemisphere	17,435	19,661	4,815	5,619
South and Central America	6,624	7,076	954	161
Other Western Hemisphere	10,812	12,584	3,860	5,458
Africa	591	601	D	D
Middle East	6,425	4,114	D	D
Asia and Pacific	77,664	95,131	16,365	18,801
Australia	7,224	8,394	1,251	1,889
Japan	67,319	83,498	13,978	15,169

Source: U.S. Department of Commerce, "Survey of Current Business" (June 1991)

Note: Historical cost reflects book value and does not necessarily reflect current market value of investments.

p – preliminary, r – revised, na – not available, E – estimated, D – not disclosed

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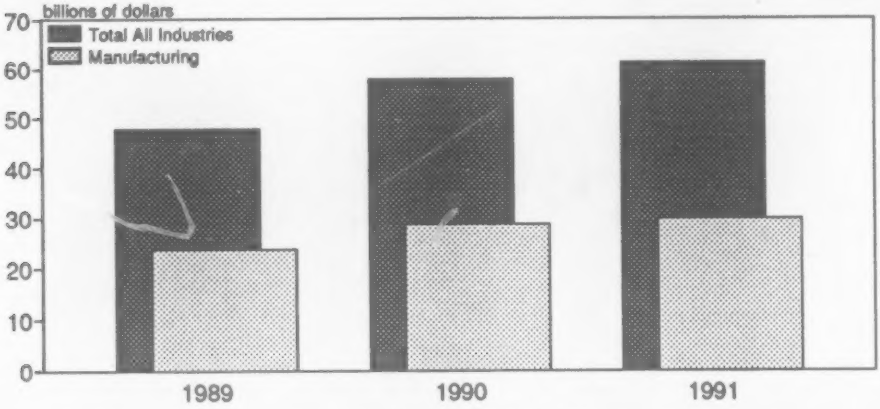
Capital Expenditures by Majority–Owned Foreign Affiliates of U.S. Companies



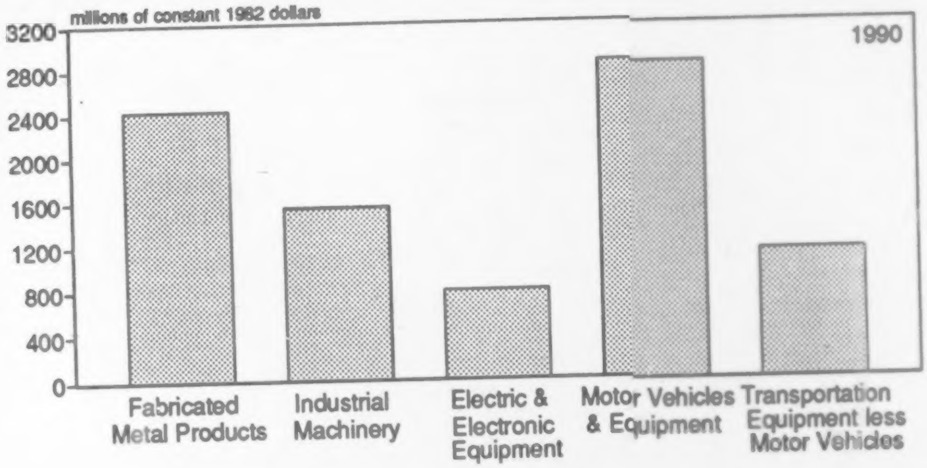
(millions of U.S. dollars)

	Total All Industries			Manufacturing		
	1989(r)	1990(p)	1991(E)	1989(r)	1990(p)	1991(E)
World	$47,904	$57,962	$61,235	$23,818	$28,759	$29,810
Canada	8,517	8,933	7,980	4,464	4,282	3,564
Europe	24,641	31,335	34,670	13,378	17,397	18,578
EC (12)	22,691	29,010	32,053	13,057	16,896	18,048
Belgium	1,031	1,451	1,516	777	1,074	1,124
France	2,684	3,516	3,874	1,551	2,245	2,317
Germany	4,457	5,690	6,723	3,287	4,354	5,060
Italy	1,435	2,126	1,951	938	1,181	1,333
Netherlands	1,397	2,085	2,127	971	1,587	1,503
Spain	1,075	1,316	1,366	872	1,066	965
United Kingdom	9,755	11,780	13,356	4,074	4,705	4,983
Other EC	857	1,046	1,140	587	684	763
Other Europe	1,950	2,324	2,617	322	501	530
Japan	1,978	1,937	2,264	1,471	1,311	1,568
Australia	2,267	2,140	2,496	752	877	948
New Zealand & S. Africa	271	277	282	74	66	72
Latin America and Other Western Hemisphere	4,302	5,226	5,500	2,543	3,340	3,556
South America	2,973	3,444	3,692	1,859	2,332	2,530
Brazil	1,929	2,316	2,416	1,426	1,765	1,853
Other South America	1,044	1,128	1,276	433	567	677
Central America	854	1,273	1,355	650	974	990
Mexico	733	1,115	1,186	611	904	942
Other Central America	121	158	169	39	70	48
Other Western Hemisphere	474	510	452	33	34	36
Other Africa	919	1,557	1,456	50	50	44
Middle East	452	703	687	38	43	49
Other Asia and Pacific	3,725	4,849	5,180	1,047	1,393	1,430

Source: U.S. Department of Commerce, "Survey of Current Business" (March 1991)

Note: Capital expenditures previously were referred to as "property, plant and equipment expenditures." They represent gross outlays charged to capital accounts to acquire, add to, or improve real property, plant and equipment. Sales or other dispositions of fixed assets are not netted against these outlays.

p – preliminary, r – revised, na – not available, E – estimated, D – not disclosed



Year	Fabricated Metal Products	Industrial Machinery	Electric & Electronic Equipment	Motor Vehicles & Equipment	Transportation Equipment less Motor Vehicles
			Current Dollars (millions)		
1986	$3,945	$2,844	$1,517	$5,832	$2,194
1987	3,349	2,465	1,323	4,417	1,913
1988	3,569	2,781	1,548	4,092	1,909
1989	4,028	2,802	1,299	4,634	2,031
1990	4,386	2,860	1,345	4,810	1,973
			Constant 1982 Dollars (millions)		
1971	$1,089	$ 984	$ 842	$3,061	$ 373
1972	1,243	980	1,077	3,097	531
1973	1,934	983	1,386	2,900	640
1974	2,068	1,004	1,404	3,598	782
1975	2,046	1,032	795	2,546	810
1976	2,085	1,058	708	2,830	894
1977	2,419	1,089	613	3,810	783
1978	2,500	1,130	741	4,844	1,011
1979	2,625	1,184	958	4,856	1,139
1980	2,782	1,247	938	4,815	1,235
1981	2,631	1,298	702	6,157	1,029
1982	1,696	1,344	964	2,854	1,085
1983	1,514	1,385	1,000	1,446	952
1984	1,925	1,414	1,102	2,803	1,205
1985	2,100	1,443	1,156	3,729	1,339
1986	2,205	1,465	982	3,801	1,471
1987	2,159	1,482	940	3,055	1,371
1988	2,252	1,505	1,096	2,699	1,309
1989	2,502	1,528	847	3,046	1,344
1990	2,425	1,545	787	2,848	1,140

Source: U.S. Department of Commerce, Bureau of Economic Analysis

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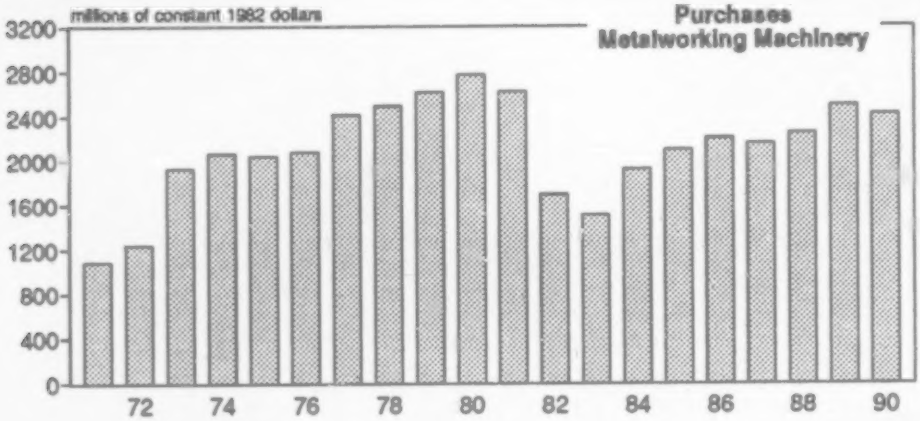

Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
		Current Dollars (millions)		
1986	$3,945	$1,917	$2,028	10.39 yrs.
1987	3,349	2,042	1,307	10.56
1988	3,569	2,157	1,412	10.71
1989	4,028	2,290	1,738	10.82
1990	4,386	2,462	1,924	10.95
		Constant 1982 Dollars (millions)		
1971	$1,089	$ 915	$ 174	10.57 yrs.
1972	1,243	939	304	10.65
1973	1,934	982	952	10.44
1974	2,068	1,041	1,027	10.25
1975	2,046	1,097	949	10.09
1976	2,085	1,153	932	9.95
1977	2,419	1,216	1,203	9.76
1978	2,500	1,289	1,211	9.61
1979	2,625	1,363	1,262	9.48
1980	2,782	1,444	1,338	9.37
1981	2,631	1,524	1,107	9.35
1982	1,696	1,580	116	9.59
1983	1,514	1,610	–96	9.89
1984	1,925	1,644	281	10.09
1985	2,100	1,689	411	10.24
1986	2,205	1,738	467	10.39
1987	2,159	1,786	373	10.56
1988	2,252	1,834	418	10.71
1989	2,502	1,888	614	10.82
1990	2,425	1,942	483	10.95

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power–driven hand tools, rolling mill machinery, and welding and soldering equipment.

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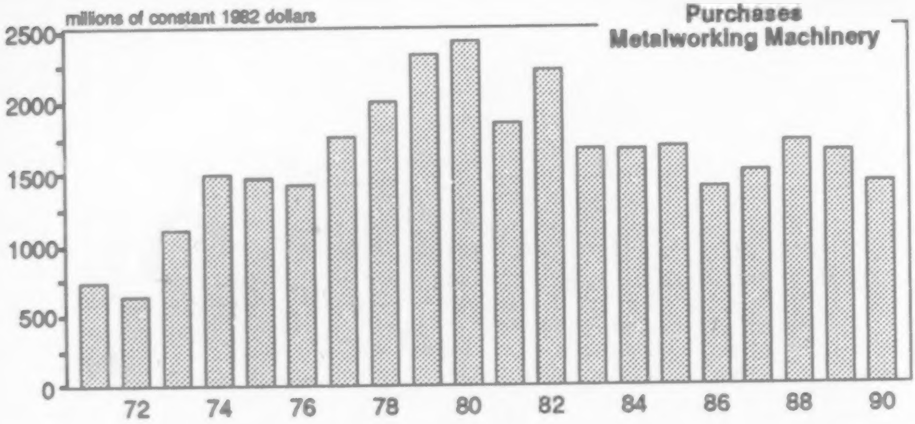
CAPITAL EQUIPMENT PURCHASES

Industrial Machinery Industry (SIC 35)



Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
		Current Dollars (millions)		
1986	$2,844	$1,616	$1,228	11.32 yrs.
1987	2,465	1,694	771	11.48
1988	2,781	1,769	1,012	11.59
1989	2,802	1,854	948	11.72
1990	2,860	1,959	901	11.93
		Constant 1982 Dollars (millions)		
1971	$ 734	$ 984	$ -250	11.68 yrs.
1972	638	980	-342	11.97
1973	1,100	983	117	12.04
1974	1,490	1,004	486	11.94
1975	1,463	1,032	431	11.88
1976	1,416	1,058	358	11.85
1977	1,749	1,089	660	11.67
1978	1,994	1,130	864	11.44
1979	2,321	1,184	1,137	11.16
1980	2,413	1,247	1,166	10.91
1981	1,842	1,298	544	10.90
1982	2,210	1,344	866	10.79
1983	1,664	1,385	279	10.88
1984	1,657	1,414	243	11.00
1985	1,678	1,443	235	11.12
1986	1,391	1,465	-74	11.32
1987	1,506	1,482	24	11.48
1988	1,711	1,505	206	11.59
1989	1,636	1,528	108	11.72
1990	1,420	1,545	-125	11.93

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power-driven hand tools, rolling mill machinery, and welding and soldering equipment.

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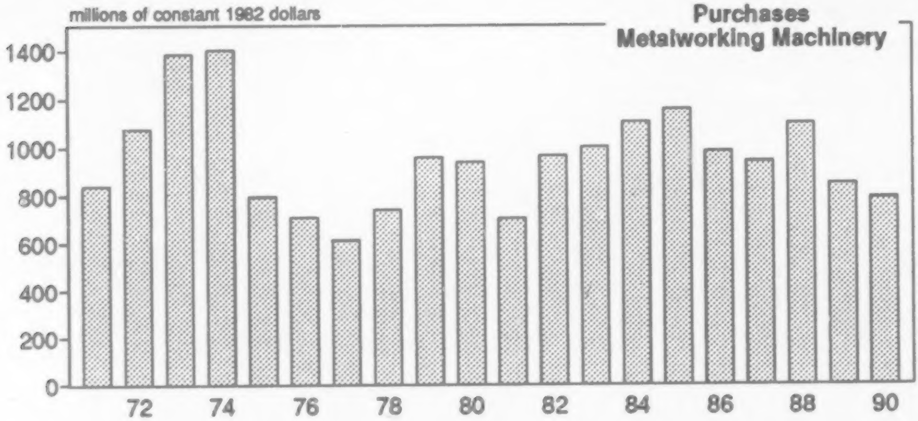


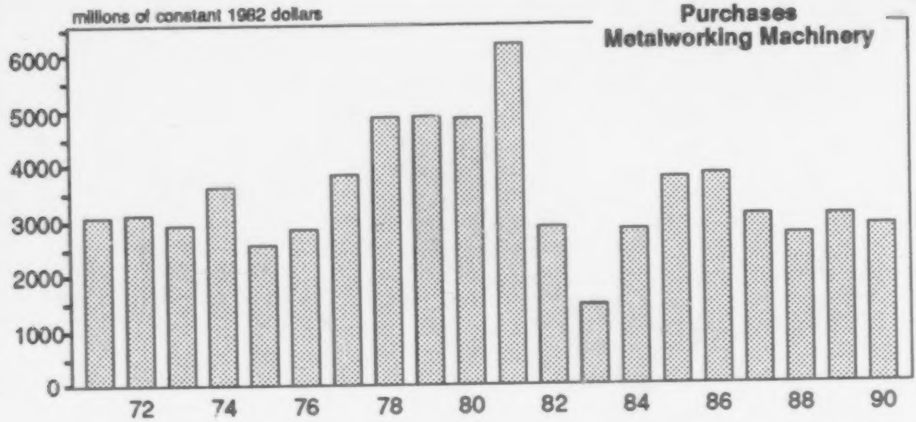
Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
		Current Dollars (millions)		
1986	$1,517	$1,041	$476	7.34 yrs.
1987	1,323	1,078	245	7.30
1988	1,548	1,115	433	7.20
1989	1,299	1,153	146	7.22
1990	1,345	1,195	150	7.29
		Constant 1982 Dollars (millions)		
1971	$ 842	$594	$ 248	5.43 yrs.
1972	1,077	643	434	5.46
1973	1,386	711	675	5.39
1974	1,404	789	615	5.42
1975	795	841	–46	5.77
1976	708	863	–155	6.16
1977	613	873	–260	6.58
1978	741	880	–139	6.90
1979	958	895	63	7.07
1980	938	911	27	7.23
1981	702	912	–210	7.49
1982	964	909	55	7.54
1983	1,000	914	86	7.55
1984	1,102	922	180	7.48
1985	1,156	935	221	7.37
1986	982	944	38	7.34
1987	940	943	–3	7.30
1988	1,096	948	148	7.20
1989	847	950	–103	7.22
1990	787	942	–155	7.29

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power–driven hand tools, rolling mill machinery, and welding and soldering equipment.

G

Motor Vehicles & Equip. Industry (SIC 371)

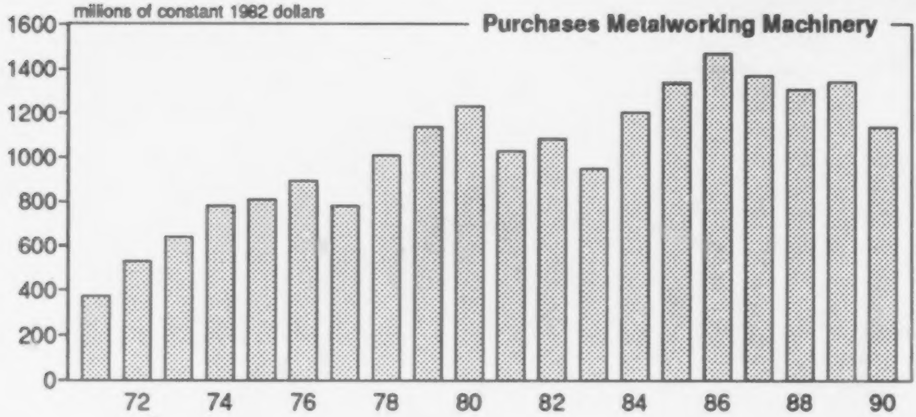


Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
		Current Dollars (millions)		
1986	$5,832	$4,012	$1,820	7.28 yrs.
1987	4,417	4,164	253	7.43
1988	4,092	4,228	–136	7.63
1989	4,634	4,294	340	7.74
1990	4,810	4,419	391	7.88
		Constant 1982 Dollars (millions)		
1971	$3,061	$2,320	$ 741	6.26 yrs.
1972	3,097	2,425	672	6.28
1973	2,900	2,520	380	6.38
1974	3,598	2,628	970	6.38
1975	2,546	2,716	–170	6.60
1976	2,830	2,766	64	6.76
1977	3,810	2,854	956	6.76
1978	4,844	3,008	1,836	6.63
1979	4,856	3,191	1,665	6.54
1980	4,815	3,361	1,454	6.49
1981	6,157	3,573	2,584	6.30
1982	2,854	3,702	–848	6.55
1983	1,446	3,644	–2,198	6.96
1984	2,803	3,578	–775	7.16
1985	3,729	3,592	137	7.22
1986	3,801	3,637	164	7.28
1987	3,055	3,643	–588	7.43
1988	2,699	3,595	–896	7.63
1989	3,046	3,540	–494	7.74
1990	2,848	3,485	–637	7.88

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power–driven hand tools, rolling mill machinery, and welding and soldering equipment.

Transportation Equip. Industry Except Motor Vehicles & Equip. (SIC 37 LESS 371)



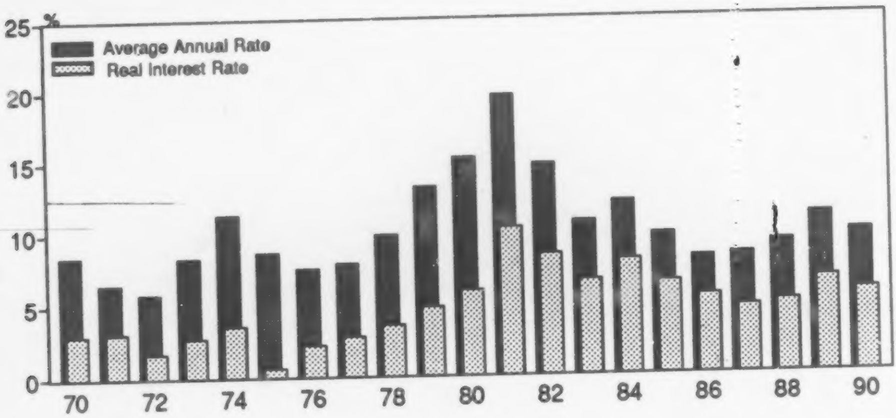
Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
		Current Dollars (millions)		
1986	$2,194	$1,030	$1,164	7.47 yrs.
1987	1,913	1,123	790	7.50
1988	1,909	1,204	705	7.58
1989	2,031	1,287	744	7.66
1990	1,973	1,384	589	7.84
		Constant 1982 Dollars (millions)		
1971	$ 373	$ 403	$ -30	6.96 yrs.
1972	531	417	114	7.12
1973	640	438	202	7.17
1974	782	466	316	7.14
1975	810	499	311	7.14
1976	894	533	361	7.10
1977	783	565	218	7.20
1978	1,011	599	412	7.19
1979	1,139	644	495	7.14
1980	1,235	693	542	7.09
1981	1,029	736	293	7.19
1982	1,085	772	313	7.28
1983	952	804	148	7.45
1984	1,205	838	367	7.50
1985	1,339	883	456	7.51
1986	1,471	934	537	7.47
1987	1,371	983	388	7.50
1988	1,309	1,023	286	7.58
1989	1,344	1,061	283	7.66
1990	1,140	1,091	49	7.84

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power–driven hand tools, rolling mill machinery, and welding and soldering equipment.

G

INTEREST RATES CHARGED BY BANKS ON BUSINESS LOANS



(percent per annum)

Year	Average Annual Rate	Real Interest Rate	February	May	August	November
1971	6.48%	3.09%	6.59%	6.01%	6.51%	6.18%
1972	5.82	1.68	5.52	5.59	5.84	6.33
1973	8.30	2.73	6.52	7.35	9.24	10.08
1974	11.28	3.56	9.91	11.15	12.40	11.64
1975	8.65	0.61	9.94	8.16	8.22	8.29
1976	7.52	2.18	7.54	7.44	7.80	7.28
1977	7.85	2.78	7.48	7.37	7.87	8.66
1978	9.84	3.55	8.95	9.01	9.97	11.44
1979	13.18	4.79	12.27	12.34	12.31	15.81
1980	15.17	5.91	15.67	17.75	11.56	15.70
1981	19.56	10.27	19.91	19.99	21.11	17.23
1982	14.69	8.42	17.13	17.11	13.27	11.26
1983	10.64	6.54	10.20	10.31	11.09	10.95
1984	12.02	7.99	11.06	12.45	13.29	11.29
1985	9.74	6.42	10.10	9.90	9.27	9.68
1986	8.11	5.43	9.29	8.13	7.73	7.28
1987	8.29	4.63	7.84	8.66	8.20	8.47
1988	9.18	4.98	8.37	8.49	9.75	10.11
1989	11.04	6.61	10.97	11.89	10.78	10.50
1990	9.85	5.73	9.93	9.97	9.72	9.77

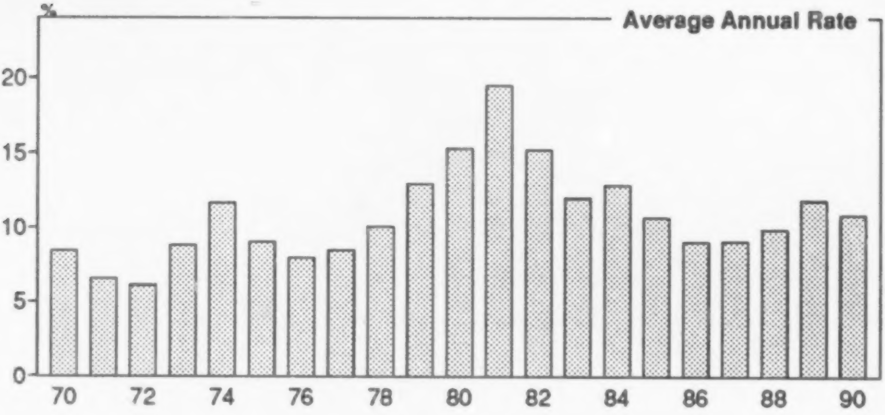
Sources: Federal Reserve Board; U.S. Bureau of Economic Analysis

Note: Real interest rates measure the after inflation cost of borrowing. We have used the Implicit GNP Deflator as our measure of inflation since it is the broadest measure of inflation and is less likely to be distorted by a large increase in a sensitive area.

The maturation period for short–term loans is less than one year.

INTEREST RATES CHARGED BY BANKS ON BUSINESS LOANS

Long–term Rates

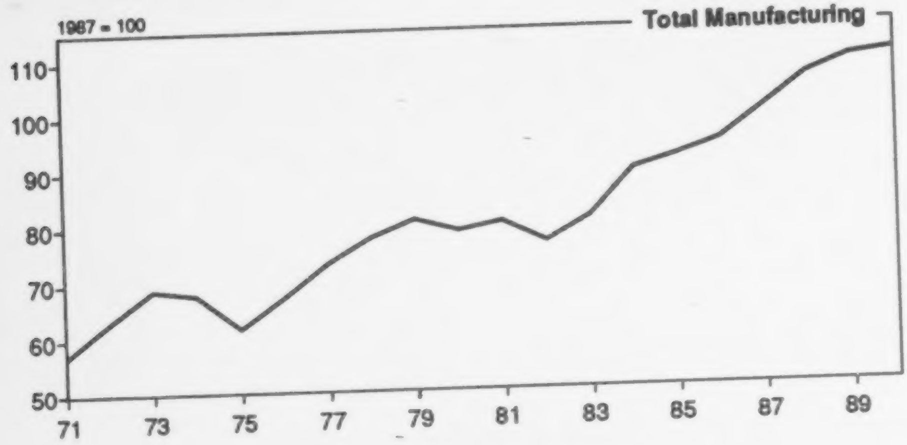


(percent per annum)

Year	Average Annual Rate	February	May	August	November
1971	6.57%	6.82%	6.36%	6.67%	6.44%
1972	6.12	5.64	5.87	6.31	6.67
1973	8.83	7.12	7.67	9.85	10.68
1974	11.70	10.16	11.41	13.08	12.16
1975	9.06	10.26	8.22	8.89	8.88
1976	7.99	8.02	8.02	8.45	7.48
1977	8.52	9.05	8.24	8.09	8.71
1978	10.11	9.19	9.67	10.20	11.38
1979	12.98	12.01	12.08	12.25	15.56
1980	15.32	15.79	18.37	12.06	15.07
1981	19.52	19.26	19.25	20.62	18.94
1982	15.25	16.59	16.96	15.22	12.24
1983	12.01	11.81	11.46	11.83	12.94
1984	12.89	11.92	13.12	13.81	12.69
1985	10.72	11.10	11.03	10.44	10.31
1986	9.08	10.26	9.07	8.73	8.24
1987	9.11	9.14	9.44	8.78	9.09
1988	9.92	9.41	9.05	10.44	10.79
1989	11.87	11.71	12.76	11.64	11.36
1990	10.89	10.92	11.08	10.72	10.82

Source: Federal Reserve Board

Note: The maturation period for long–term loans exceeds one year.



(seasonally adjusted, 1987= 100)

Year	Total Mfg.	Total Durables	Electrical Machinery	Machinery, Except Electrical	Motor Vehicles & Parts	Primary Metals	Fabricated Metals
1971	57.3	53.1	40.7	30.5	66.9	109.2	75.6
1972	63.3	59.3	46.5	35.4	73.0	122.4	82.9
1973	68.9	66.2	53.0	41.4	85.0	138.9	92.1
1974	67.9	64.8	52.4	44.1	73.4	134.5	88.4
1975	61.1	56.7	45.1	38.1	62.2	107.2	76.7
1976	67.4	62.6	50.7	40.0	81.9	119.9	84.9
1977	73.3	68.7	58.4	45.1	94.7	121.5	92.7
1978	77.8	73.9	64.0	50.2	99.2	130.7	96.2
1979	80.9	78.3	71.3	56.9	91.0	133.0	99.5
1980	78.8	75.7	73.3	60.6	67.0	110.8	92.5
1981	80.3	77.4	75.4	65.9	64.4	117.5	91.1
1982	76.6	72.7	75.9	63.9	58.8	83.2	83.2
1983	80.9	76.8	80.3	64.3	74.5	91.0	85.5
1984	89.3	88.4	94.1	80.8	90.6	102.4	93.3
1985	91.6	91.8	93.1	86.8	99.0	101.8	94.5
1986	94.3	93.9	94.3	90.4	98.5	93.8	93.8
1987	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1988	105.8	107.6	106.5	113.8	105.5	110.3	106.2
1989	108.9	110.9	109.5	121.8	104.9	109.2	107.2
1990	109.9	111.6	111.5	126.5	96.8	108.3	105.9
1990 1st Qtr.	109.2	110.4	111.3	124.4	91.5	106.1	105.4
2nd Qtr.	110.2	112.4	112.2	126.7	102.6	107.4	106.3
3rd Qtr.	111.1	113.6	112.4	128.5	103.7	112.2	107.5
4th Qtr.	109.0	109.9	110.0	126.4	89.4	107.3	104.2
1991 1st Qtr.	106.1	106.1	108.1	124.4	80.7	98.0	99.5
2nd Qtr.	106.5(p)	106.7(p)	110.2(p)	123.4(p)	89.5(p)	96.4(p)	99.4(p)

Source: Federal Reserve Board

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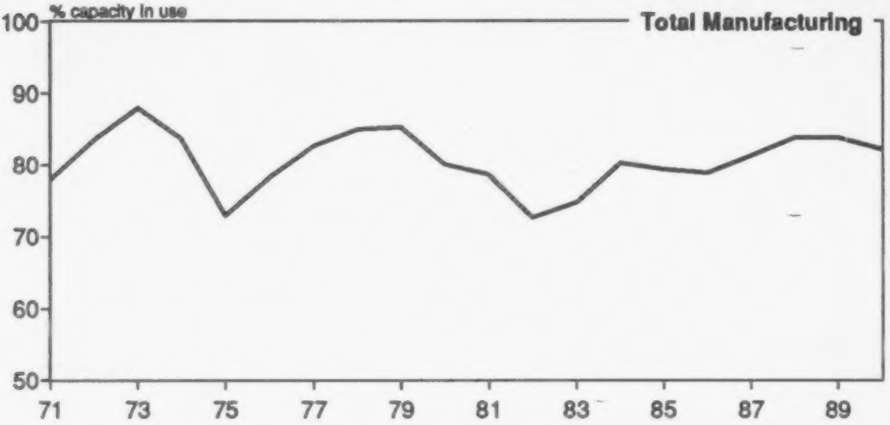
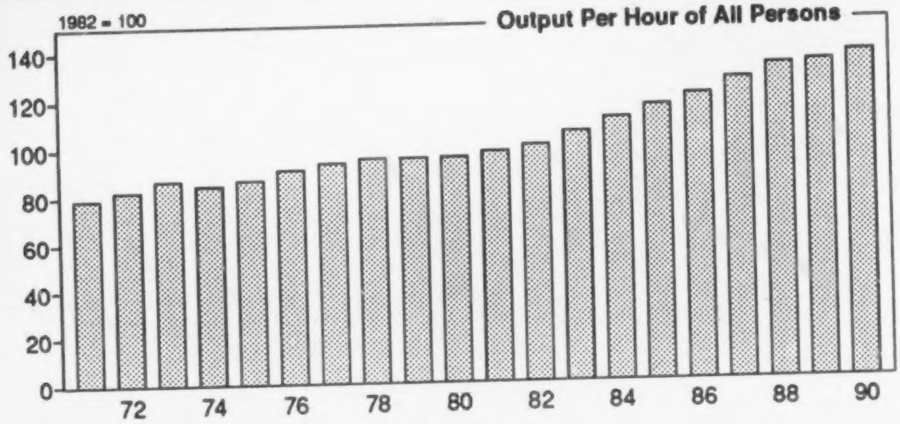


Year	Total Mfg.	Total Durables	Electrical Machinery	Machinery, Except Electrical	Motor Vehicles & Parts	Primary Metals	Fabricated Metals
1971	78.2%	74.3%	72.4%	73.3%	79.6%	75.1%	73.7%
1972	83.7	80.9	79.7	82.8	82.6	84.0	79.9
1973	88.1	87.5	86.6	93.4	91.5	94.0	86.8
1974	83.8	82.7	80.6	94.9	76.2	91.2	80.9
1975	73.2	70.2	66.1	78.6	62.8	72.1	68.6
1976	78.5	75.4	71.9	78.9	79.6	79.4	74.6
1977	82.8	80.3	79.7	84.4	88.9	79.7	79.8
1978	85.1	83.5	83.2	87.6	89.6	86.9	80.8
1979	85.4	84.9	87.6	90.7	79.2	87.9	82.0
1980	80.2	78.6	84.7	86.2	57.8	73.6	75.1
1981	78.8	76.6	81.3	82.5	56.5	77.9	72.6
1982	72.8	69.0	76.4	71.7	52.5	55.4	65.8
1983	74.9	70.5	76.7	66.0	65.4	62.3	67.9
1984	80.4	78.3	85.7	75.7	78.6	72.7	74.3
1985	79.5	77.8	80.7	73.4	83.4	74.0	74.9
1986	79.0	76.1	78.3	69.6	79.5	70.7	73.9
1987	81.4	78.6	80.0	72.4	78.1	79.6	78.5
1988	83.9	82.5	82.3	79.5	80.5	88.6	83.1
1989	83.9	82.8	81.6	82.2	79.2	86.6	83.1
1990	82.3	81.1	79.9	82.2	72.6	84.9	80.8
1990 1st Qtr.	82.6	81.0	80.9	82.1	69.0	83.4	80.9
2nd Qtr.	82.8	81.9	80.8	82.7	76.5	84.3	81.2
3rd Qtr.	82.8	82.1	80.2	83.0	77.2	88.0	81.8
4th Qtr.	80.8	79.2	77.8	80.8	67.2	83.9	79.1
1991 1st Qtr.	78.0	75.8	75.7	78.8	60.5	76.4	75.3
2nd Qtr.	77.8(p)	75.7(p)	76.6(p)	77.4(p)	66.7(p)	75.0(p)	75.0(p)

Source: Federal Reserve Board



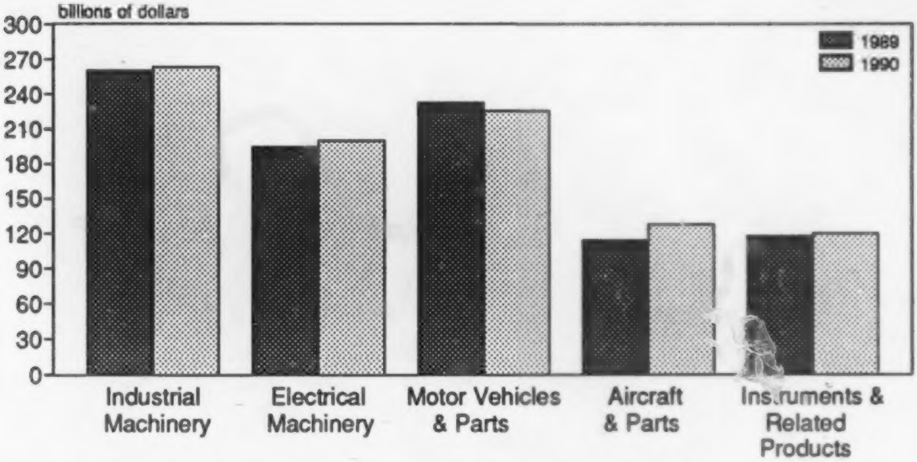
(1982=100)

Year	Productivity (a) (Output Per Hour of All Persons)	Output	Hours (All Persons)	Hourly (b) Compensation	Unit Labor Costs
1971	79.0	81.2	102.8	90.3	47.9
1972	82.3	88.4	107.5	92.0	48.4
1973	86.7	97.9	112.9	93.3	49.5
1974	84.5	93.2	110.3	93.4	56.5
1975	86.7	86.3	99.5	95.8	61.6
1976	90.8	94.6	104.2	98.1	63.7
1977	93.6	101.6	108.6	100.2	67.2
1978	95.2	107.7	113.1	101.0	71.6
1979	95.2	109.8	115.3	99.5	78.6
1980	95.4	104.8	109.9	98.0	87.8
1981	97.5	106.5	109.3	97.5	94.1
1982	100.0	100.0	100.0	100.0	100.0
1983	105.2	106.4	101.2	99.4	97.5
1984	110.8	119.4	107.8	98.4	95.6
1985	115.9	124.0	107.0	99.7	95.9
1986	120.3	126.8	105.4	102.3	96.6
1987	126.4	132.3	106.2	101.0	95.5
1988	132.1	139.9	109.4	100.2	96.1
1989	133.3	144.0	109.8	99.4	97.4
1990	136.8	147.0	107.4	97.4	96.5
1990 1st Qtr.	135.1	145.9	108.0	97.6	96.0
2nd Qtr.	136.1	147.5	108.3	97.8	96.4
3rd Qtr.	137.9	148.8	107.9	97.2	96.1
4th Qtr.	137.5	145.7	106.0	96.7	97.5
1991 1st Qtr.	137.2	141.7	103.3	96.6	98.5

Source: U.S. Department of Labor, Bureau of Labor Statistics

Note: (a) – The productivity index is obtained by dividing the constant dollar output index by the labor input (hours) index, (b) – Compensation per hour adjusted for changes in the Consumer Price Index for Urban Consumers

This table is based on output and compensation data published by the Department of Commerce. The indexes for manufacturing output, which are based on figures taken from Gross National Product components, vary from those for manufacturing production in the tables of industrial production indexes. The latter are generated independently by the Federal Reserve Board from its own survey and using its own methodology.

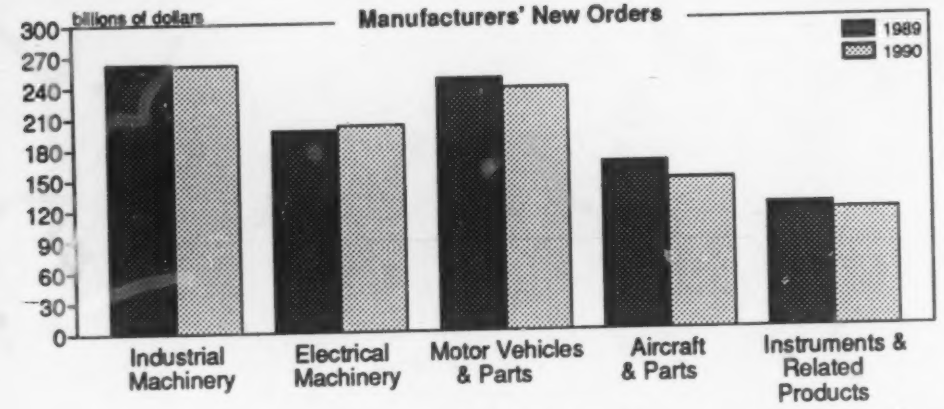


(billions of dollars)

Year	Total Manufacturing	Durables	By Industry Group Primary Metals	Fabricated Metal Products	Industrial Machinery	Electrical Machinery
1982(r)	$1,960.2	$ 950.5	$104.9	$119.2	$186.8	$125.7
1983(r)	2,070.6	1,025.8	109.2	123.1	178.4	136.1
1984(r)	2,288.2	1,175.3	120.3	138.1	211.1	162.4
1985(r)	2,334.5	1,215.4	112.3	143.3	218.4	164.0
1986(r)	2,335.9	1,238.9	107.9	143.1	213.6	164.8
1987(r)	2,475.9	1,297.5	120.2	147.4	217.7	171.3
1988(r)	2,682.5	1,415.9	149.1	158.8	243.3	186.9
1989(r)	2,840.3	1,494.4	153.0	180.6	260.8	195.2
1990(p)	2,917.5	1,504.7	144.2	188.1	263.6	200.4

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries Nondefense	Defense
1982(r)	$112.3	$ 66.4	$ 74.9	$252.1	$ 60.2
1983(r)	148.3	75.0	79.6	242.3	73.8
1984(r)	182.0	79.1	89.4	278.9	82.3
1985(r)	193.4	91.3	96.2	293.4	95.3
1986(r)	198.8	101.8	100.8	290.0	106.2
1987(r)	205.9	103.6	107.3	295.4	103.4
1988(r)	221.6	107.7	114.5	331.1	105.3
1989(r)	233.2	114.0	118.0	364.9	106.5
1990(p)	226.1	127.8	120.2	384.7	106.9

Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"



(billions of dollars)

Year	Total Manufacturing	Durables	By Industry Group			
			Primary Metals	Fabricated Metal Products	Industrial Machinery	Electrical Machinery
1982(r)	$1,945.7	$ 936.8	$ 98.4	$113.4	$169.3	$127.6
1983(r)	2,105.4	1,057.7	113.9	122.8	178.9	142.1
1984(r)	2,314.5	1,202.0	118.4	141.7	212.1	165.5
1985(r)	2,348.5	1,228.3	112.3	142.3	218.4	163.4
1986(r)	2,342.4	1,243.8	108.2	143.5	208.6	164.3
1987(r)	2,512.7	1,329.7	126.0	150.7	221.2	173.2
1988(r)	2,724.3	1,457.3	151.7	157.4	248.7	188.7
1989(r)	2,889.1	1,543.8	149.8	177.6	262.9	197.3
1990(p)	2,923.7	1,511.5	143.4	187.0	261.4	201.3

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries	
				Nondefense	Defense
1982(r)	$120.1	$ 73.4	$ 82.1	$230.6	$ 81.4
1983(r)	161.6	87.0	83.1	235.5	96.1
1984(r)	191.4	91.6	98.9	284.0	103.5
1985(r)	202.5	100.9	106.3	294.5	109.5
1986(r)	210.0	108.0	104.6	287.8	111.9
1987(r)	220.3	114.8	109.1	313.2	111.6
1988(r)	235.0	136.9	112.7	368.7	104.3
1989(r)	246.2	162.8	120.2	417.8	109.0
1990(p)	236.6	145.8	114.2	408.4	93.4

Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"

p – preliminary, r – revised, na – not available, E – estimated, D – not disclosed

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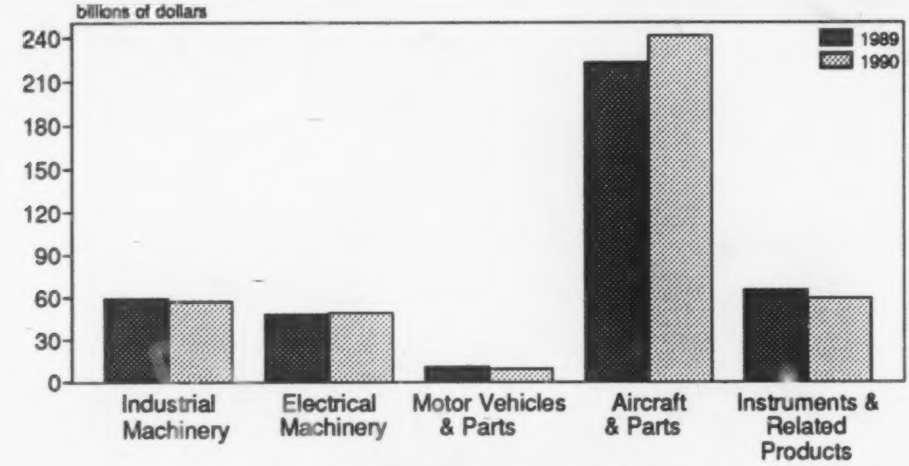
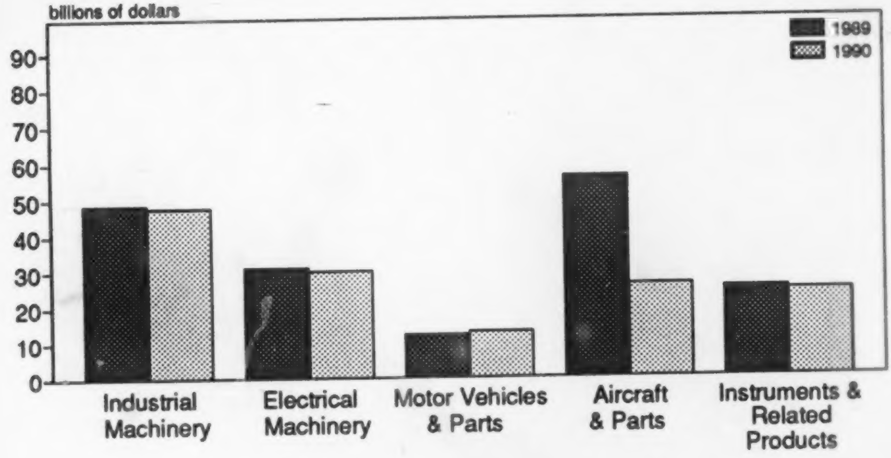


(billions of dollars, seasonally adjusted)

Year	Total Manufacturing	Durables	By Industry Group		Industrial Machinery	Electrical Machinery
			Primary Metals	Fabricated Metal Products		
1982(r)	$311.9	$300.8	$15.5	$27.1	$51.9	$34.6
1983(r)	347.3	333.2	20.4	26.8	52.4	40.8
1984(r)	373.6	359.7	18.4	30.3	53.5	44.0
1985(r)	387.2	372.2	18.4	29.2	53.5	43.3
1986(r)	393.6	376.8	18.7	29.7	48.4	42.7
1987(r)	430.6	408.9	24.5	33.0	51.9	44.6
1988(r)	472.2	450.3	27.2	31.5	57.3	46.4
1989(r)	520.8	499.5	23.9	28.5	59.4	48.4
1990(p)	527.2	506.4	23.1	27.4	57.2	49.2

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries	
				Nondefense	Defense
1982(r)	$ 7.8	$ 93.7	$37.5	$121.1	$ 99.1
1983(r)	11.9	105.5	41.0	114.3	121.2
1984(r)	10.8	117.9	50.5	119.4	142.3
1985(r)	9.6	127.4	60.5	120.6	156.3
1986(r)	9.6	133.6	64.0	118.4	161.8
1987(r)	11.6	145.0	65.4	136.1	163.8
1988(r)	11.2	174.4	63.3	173.7	162.8
1989(r)	10.5	223.2	65.3	226.6	165.1
1990(p)	9.1	241.4	59.3	250.3	151.7

Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"



(billions of dollars, seasonally adjusted)

Year	Total Manufacturing	Durables	By Industry Group Primary Metals	Fabricated Metal Products	Industrial Machinery	Electrical Machinery
1982(r)	$311.8	$200.4	$24.2	$21.4	$47.9	$25.1
1983(r)	312.4	199.8	22.3	21.8	44.6	26.9
1984(r)	339.5	221.3	22.4	23.3	48.7	31.6
1985(r)	334.8	218.2	20.0	22.9	46.5	30.5
1986(r)	322.7	212.0	18.5	22.1	42.4	23.6
1987(r)	338.2	220.8	19.1	22.9	43.1	29.8
1988(r)	367.6	241.4	22.4	24.8	47.4	31.5
1989(r)	383.8	253.3	22.7	24.6	48.6	31.1
1990(p)	388.8	252.8	23.7	24.6	47.7	30.1

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries Nondefense	Defense
1982(r)	$ 8.5	$30.4	$17.0	$73.7	$18.9
1983(r)	10.4	30.1	17.8	68.4	21.1
1984(r)	11.7	35.6	20.2	75.4	27.1
1985(r)	11.8	37.3	21.6	71.7	31.1
1986(r)	11.5	38.4	22.5	67.6	31.4
1987(r)	11.9	40.6	23.7	68.7	34.4
1988(r)	12.2	46.8	25.0	76.6	37.0
1989(r)	12.2	55.9	25.0	84.1	40.1
1990(p)	13.0	56.1	24.3	83.3	38.6

Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"

(1982 = 100, unless otherwise indicated)

Commodity	1986	1987	1988	1989	1990
Machine Tool Indexes					
Metal Cutting Machine Tools	109.6	112.6	117.4	123.4	129.8
Metal Forming Machine Tools	108.7	110.2	113.2	118.1	128.7
Finished Goods	103.2	105.4	108.0	113.6	119.2
All Commodities	100.2	102.8	106.9	112.2	116.3
Industrial Commodities	100.0	102.6	106.3	111.6	115.8
Durable Manufactured Goods	107.5	109.6	114.1	118.3	120.7
Industrial Power, 500 KW Demand	114.5	111.9	112.6	116.8	119.6
Prepared Paint	107.0	108.1	112.2	119.5	124.8
Iron and Steel	101.1	104.5	115.7	119.1	117.2
Foundry and Forge Shop Products	105.2	105.6	109.6	114.6	117.2
Gray & Ductile Iron Cast	103.7	103.4	106.0	108.8	111.6
Steel Mill Products	99.8	102.3	110.7	114.5	112.1
Semi–finished Steel Products	99.0	100.2	109.0	113.1	107.3
Finished Steel Products	99.9	102.3	110.6	114.5	112.8
Nonferrous Metals	98.5	108.7	133.2	141.5	133.8
Primary Nonferrous Metals	93.8	109.2	144.3	149.2	133.4
Nonferrous Mill Shapes	99.9	105.7	130.1	137.4	130.7
Aluminum Mill Shapes	102.6	105.5	130.9	135.4	127.9
Nonferrous Wire and Cable	101.8	106.5	129.6	146.1	142.6
Metalworking Machinery and Equipment	108.4	110.1	113.5	118.2	123.0
Cutting Tools & Access.	107.5	108.9	111.0	115.0	118.5
Abrasive Products	106.7	108.1	111.3	118.7	122.3
General Purpose Machy. & Equipment	107.2	108.3	112.7	119.0	123.7
Pumps, Compressors & Equipment	104.1	105.2	108.9	115.0	119.2
Fluid Power Equipment	109.8	111.3	114.6	119.7	123.6
Mechanical Power Transmission Equip.	110.6	112.0	116.0	121.1	125.3
Miscellaneous General Purpose Equip.	107.7	109.0	115.4	124.4	130.9
Ball & Roller Bearings	107.3	107.8	114.0	124.1	130.6
Electrical Machinery and Equipment	111.2	112.7	114.4	117.5	119.3
Motors, Generators & Mtr Generator Sets	113.5	115.4	121.8	129.0	132.9
Integral Elec. Motors, AC (a)	106.1	105.6	113.9	121.7	130.6
Transformers and Power Regulators	105.6	107.6	108.8	117.3	120.9
Switchgear, Switchboard, etc. Equip.	108.1	110.2	113.2	119.0	124.4
Industrial Controls	107.4	109.1	111.9	116.6	122.0
Electronic Components & Accessories	114.5	115.1	117.5	119.4	118.4
Other Manufacturing Technology Indexes					
Assembly Machines (a)	109.9	110.2	113.4	116.6	118.5
Precision Measuring Tools	112.4	115.2	120.5	124.7	129.1
Industrial Material Handling Equipment	103.4	104.3	107.5	111.7	115.0
Plasticworking Machinery	111.8	124.9	129.4	134.2	138.2
Semiconductor Machinery & Parts (b)	na	na	100.8	103.8	108.3
Integrating and Measuring Equipment	111.2	113.7	115.2	119.7	126.7

Source: U. S. Department of Labor, Bureau of Labor Statistics

Note: (a) – June 1983 = 100, (b) – June 1987 = 100

The individual commodities shown are selected components of each major commodity grouping. All indexes are annual averages.

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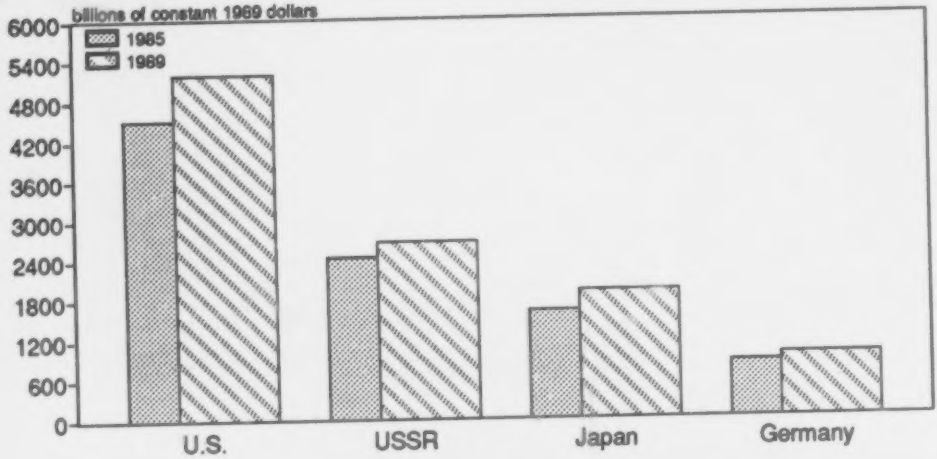
Estimated Gross National Product



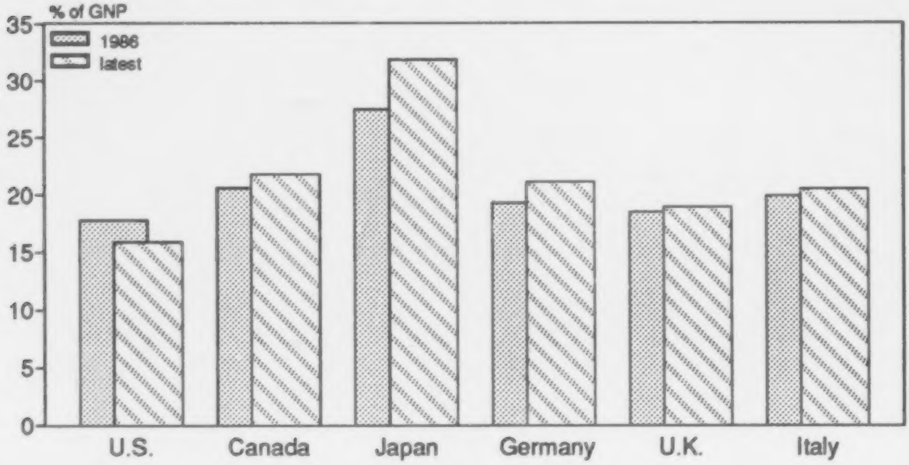
(billions of constant 1989 dollars)

	1985	1986	1987	1988	1989
United States	$4,513	$4,652	$4,830	$5,048	$5,198
Soviet Union	2,441	2,525	2,574	2,631	2,664
Japan	1,617	1,657	1,727	1,825	1,913
Germany	839	858	874	906	943
France	734	751	765	792	819
United Kingdom	708	733	768	799	818
Italy	708	726	748	777	801
Other EC	540	551	559	577	596
Canada	441	455	475	499	513
China	308	334	371	411	427
Spain	332	343	362	380	397
Brazil	304	327	339	338	350
India	206	219	229	247	257
South Korea	151	159	177	197	210
Mexico	198	191	194	196	201
Poland	171	176	172	175	172
Taiwan	101	115	128	137	147
Sweden	121	123	127	130	133
Czechoslovakia	116	119	120	122	123
Switzerland	107	110	112	116	120
Indonesia	74	77	80	84	89
Thailand	48	50	54	60	67
Hungary	62	64	64	66	65
Argentina	71	75	76	76	72
Venezuela	38	41	42	44	40

Source: Central Intelligence Agency, Handbook of Economic Statistics, 1989

Note: International comparisons of gross national product must be used with caution. Measuring the size of economies that do not use the market system is a difficult task. Germany does not include former East Germany.

Gross Fixed Capital Formation as a Percent of GNP



(percent of GNP)

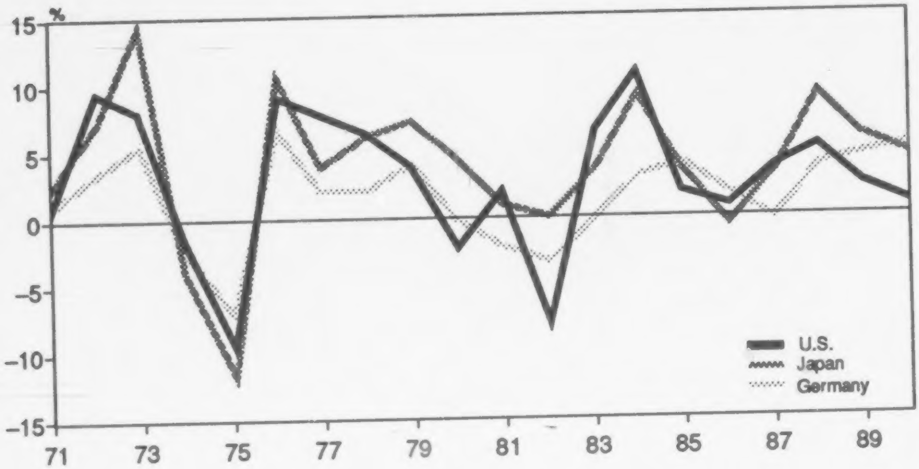
	1986	1987	1988	1989	1990
United States	17.8%	17.1%	16.7%	16.4%	15.9%
Canada	20.8	21.7	22.5	22.8	21.6
Mexico	20.6	19.9	na	na	na
Japan	27.5	28.7	30.3	31.9	na
South Korea	28.2	28.1	26.8	31.9	29.0
Malaysia	27.8	24.7	23.6	31.2	na
Thailand	22.2	24.1	27.5	31.4	35.9
Germany	19.3	19.3	19.4	20.1	21.1
France	19.3	19.5	20.6	21.1	21.2
United Kingdom	16.5	17.4	19.0	19.4	18.9
Italy	19.9	20.0	20.2	20.5	na
Sweden	22.4	19.2	20.0	21.7	20.9
Switzerland	23.1	24.2	25.3	26.2	na

Source: International Monetary Fund, "International Financial Statistics"

Note: Fixed Capital Formation consists of non–residential structures and producers durable equipment as well as residential structures.

INDUSTRIAL PRODUCTION[1]

Annual Growth Rate

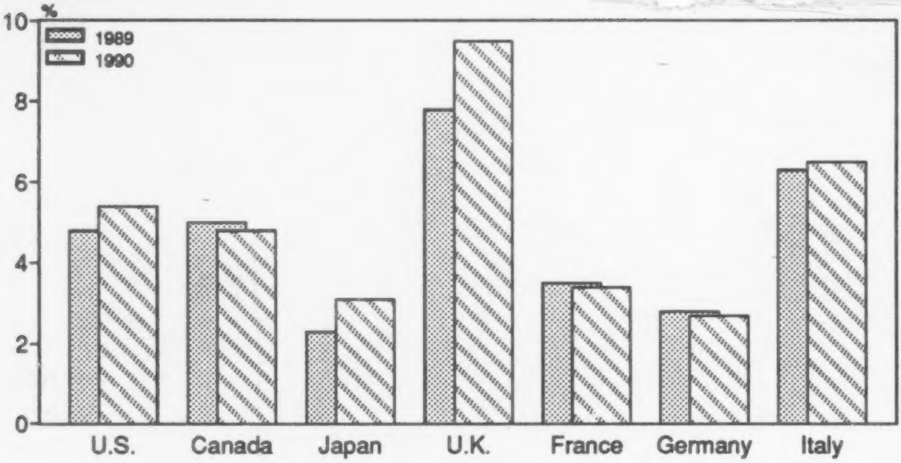


Year	United States	Canada	Japan	United Kingdom	France	Germany	Italy
1971	1.3%	5.4%	2.7%	−0.6%	6.8%	1.2%	−0.1%
1972	9.7	7.6	7.3	1.8	5.1	3.6	4.2
1973	8.1	9.9	14.9	9.0	7.3	5.7	9.7
1974	−1.5	3.5	−3.9	−2.1	2.3	−2.2	4.5
1975	−8.8	−6.1	−11.0	−5.4	−6.7	−6.7	−9.1
1976	9.3	5.5	11.2	3.3	8.3	7.1	12.3
1977	7.9	2.3	4.1	5.2	1.1	2.2	−0.8
1978	6.5	4.0	6.3	2.8	2.2	2.2	3.8
1979	4.0	6.0	7.4	3.9	4.3	4.3	6.7
1980	−1.9	−3.4	4.6	−6.6	1.0	0.0	5.5
1981	2.3	2.0	1.1	−3.1	−2.0	−2.0	−1.5
1982	−7.2	−9.8	0.2	1.9	0.0	−3.1	−3.0
1983	6.5	7.5	3.6	3.7	0.0	0.0	−3.2
1984	11.1	12.1	9.4	0.2	2.1	3.2	3.2
1985	2.0	5.6	3.7	5.4	1.0	4.2	1.1
1986(r)	1.0	−0.1	−0.3	2.2	1.0	2.0	3.6
1987(r)	3.8	5.7	3.4	3.5	2.0	0.0	4.0
1988(r)	5.4	6.2	9.5	3.7	3.9	3.9	5.9
1989(r)	2.5	1.1	6.0	0.3	3.8	4.7	3.1
1990(p)	1.1	−3.3	4.7	−0.7	0.9	5.4	0.0

Source: International Monetary Fund, "International Financial Statistics"

Note: [1]Excludes construction

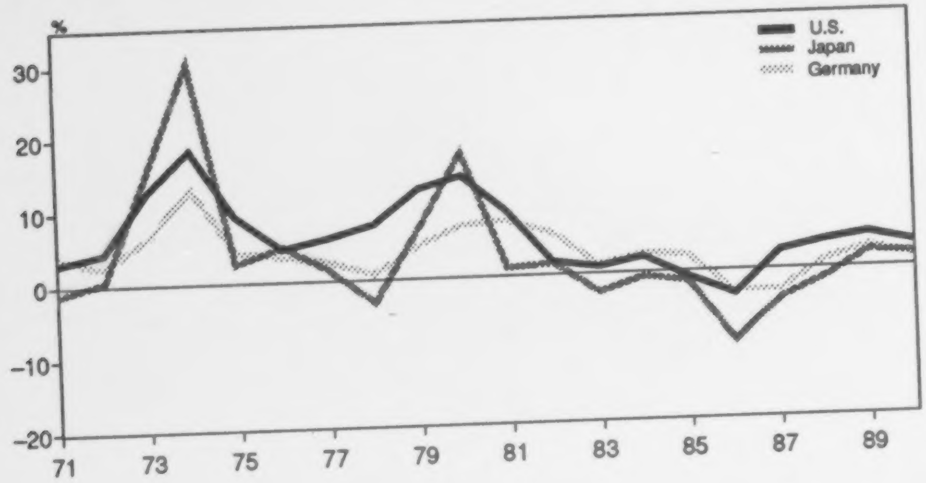
Consumer Prices



Year	United States	Canada	Japan	United Kingdom	France	Germany	Italy
1971	4.2%	2.8%	6.5%	9.2%	5.1%	5.2%	5.0%
1972	3.5	4.8	4.8	7.5	6.4	5.5	6.1
1973	6.2	7.5	11.7	9.1	7.4	7.2	10.3
1974	10.9	11.0	23.3	15.9	13.5	6.8	19.2
1975	9.2	10.8	11.6	24.1	11.9	5.9	17.1
1976	6.0	7.4	9.5	16.6	9.6	4.3	16.7
1977	6.4	8.1	8.1	15.9	9.5	3.8	18.6
1978	7.6	9.0	4.3	8.2	9.1	2.6	12.0
1979	11.2	9.1	3.7	13.4	10.7	4.1	14.8
1980	13.5	10.1	7.7	18.0	13.2	5.5	21.3
1981	10.4	12.4	5.0	11.9	13.4	6.3	19.5
1982	6.0	10.8	2.7	8.6	11.8	5.2	16.5
1983	3.2	5.9	1.8	4.5	9.6	3.4	14.7
1984	4.3	4.3	2.3	5.0	7.5	2.4	10.8
1985	3.5	4.0	2.0	6.0	5.7	2.1	9.2
1986	1.9	4.2	0.6	3.4	2.5	–0.1	5.9
1987	3.7	4.3	0.1	4.2	3.3	0.2	4.7
1988	4.0	4.0	0.7	4.9	2.7	1.3	5.0
1989	4.8	5.0	2.3	7.8	3.5	2.8	6.3
1990	5.4	4.8	3.1	9.5	3.4	2.7	6.5

Source: International Monetary Fund, "International Financial Statistics"

ANNUAL CHANGE IN PRICES



Year	United States	Canada	Japan	United Kingdom	France	Germany	Italy
1971	3.4%	2.0%	–0.8%	9.4%	2.1%	4.2%	4.4%
1972	4.6	4.5	0.8	5.0	4.5	2.7	3.5
1973	13.0	11.3	15.8	7.3	14.8	6.6	17.6
1974	18.8	19.0	31.4	23.7	29.2	13.6	40.2
1975	9.3	11.1	3.0	23.1	–5.8	4.5	8.6
1976	4.8	5.2	5.1	16.1	7.3	3.7	23.0
1977	6.1	7.9	1.9	18.2	5.7	2.9	17.5
1978	7.8	9.2	–2.6	9.8	4.4	1.1	8.4
1979	12.5	14.6	7.3	10.9	13.3	4.8	15.4
1980	14.2	13.5	17.8	14.1	8.8	7.5	20.0
1981	9.1	10.1	1.4	9.6	11.0	7.8	17.6
1982	2.0	6.1	1.8	7.7	11.0	5.9	13.8
1983	1.2	3.4	–2.2	5.4	11.1	1.5	9.8
1984	2.4	4.1	–0.3	5.8	13.2	2.8	10.4
1985	–0.5	2.7	–1.1	5.3	4.1	2.5	7.3
1986	–2.9	0.8	–9.1	4.3	–2.8	–2.5	–0.9
1987	2.7	2.7	–3.7	3.9	0.2	–2.5	2.6
1988(r)	4.0	3.9	–1.0	4.4	5.2	1.3	4.7
1989(r)	4.9	2.7	2.5	5.1	5.5	3.1	6.4
1990(p)	3.6	0.2	2.0	5.9	–1.2(a)	1.7	na

Source: International Monetary Fund, "International Financial Statistics"

Note: (a) – intermediate industrial goods prices

	United States	Canada	Japan	France	Germany	Italy	United Kingdom
	Output Per Man Hour (Productivity) (1982 = 100)						
1981	97.9	104.8	94.3	93.4	99.3	97.6	94.5
1982	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1983	105.0	107.3	105.4	102.5	105.1	105.3	108.4
1984	110.0	116.4	113.0	104.5	108.5	115.8	114.0
1985	114.8	119.8	119.4	108.8	112.4	122.1	117.8
1986	120.0	117.9	121.3	110.8	111.4	123.2	122.6
1987	126.1	118.4	130.7	113.8	108.5	126.5	130.1
1988	133.6	119.1	136.9	119.6	112.3	130.1	136.8
1989	138.0	119.9	145.2	125.1	117.0	133.8	143.1
1990	na	na	na	na	na	na	na
	Unit Labor Cost (1982 = 100)						
1981	93.8	86.3	100.8	90.3	96.8	86.9	96.8
1982	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1983	97.7	98.9	97.7	107.6	99.4	111.2	98.6
1984	96.3	95.5	93.9	114.9	100.4	115.9	100.4
1985	96.8	97.6	92.9	119.9	102.4	123.6	104.2
1986	96.8	102.9	95.9	122.8	107.5	127.5	108.6
1987	94.3	106.1	91.1	125.6	115.4	131.8	109.4
1988	92.0	110.4	88.9	124.6	115.8	135.0	109.7
1989	92.6	117.8	89.2	124.4	116.2	145.3	113.6
1990	na	na	na	na	na	na	na
	Hourly Compensation For Manufacturing Production Workers (in U.S. dollars)						
1981	$10.84	$ 9.22	$ 6.18	$ 8.02	$10.53	$7.39	$ 7.20
1982	11.64	10.09	5.70	7.85	10.28	7.27	6.82
1983	12.10	10.85	6.13	7.74	10.23	7.59	6.39
1984	12.51	10.99	6.34	7.29	9.43	7.25	5.95
1985	12.96	10.80	6.43	7.52	9.56	7.32	6.19
1986	13.21	11.00	9.31	10.27	13.29	9.91	7.54
1987	13.40	11.96	10.83	12.42	16.91	12.14	8.97
1988	13.85	13.56	12.80	12.96	18.04	12.89	10.46
1989	14.28	14.86	12.63	12.60	17.51	13.26	10.43
1990	14.83	15.94	12.84	15.25	21.30	16.29	12.42

Source: U.S. Department of Labor, Bureau of Labor Statistics

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p – preliminary, r – revised, na – not available, E – estimated by NMTBA, D – not disclosed

(currency units per U.S. dollar, except for United Kingdom where values are U.S. dollars per U.K. pound)

	Canada	Japan	France	Germany	Italy	United Kingdom
1971	1.0099	347.79	5.5100	3.4830	618.34	2.4442
1972	.9907	303.13	5.0444	3.1886	583.70	2.5034
1973	1.0002	271.31	4.4535	2.6715	582.41	2.4525
1974	.9780	291.84	4.8107	2.5868	650.81	2.3403
1975	1.0175	296.78	4.2877	2.4614	653.10	2.2217
1976	.9863	296.45	4.7825	2.5185	833.58	1.8048
1977	1.0633	268.62	4.9161	2.3236	882.78	1.7449
1978	1.1405	210.39	4.5091	2.0097	849.13	1.9184
1979	1.1713	219.02	4.2567	1.8343	831.11	2.1224
1980	1.1693	226.63	4.2251	1.8175	856.21	2.3246
1981	1.1990	220.63	5.4397	2.2632	1138.58	2.0243
1982	1.2344	249.06	6.5794	2.4281	1354.00	1.7480
1983	1.2325	237.55	7.6204	2.5539	1519.32	1.5159
1984	1.2952	237.46	8.7356	2.8455	1756.11	1.3368
1985	1.3659	238.47	8.9800	2.9420	1908.88	1.2974
1986	1.3896	168.35	6.9257	2.1705	1491.16	1.4677
1987	1.3259	144.60	6.0122	1.7981	1297.03	1.6398
1988	1.2306	128.17	5.9595	1.7570	1302.39	1.7813
1989	1.1842	138.07	6.3802	1.8808	1372.28	1.6382
1990	1.1668	145.00	5.4467	1.6166	1198.27	1.7841

Source: U.S. Federal Reserve Board

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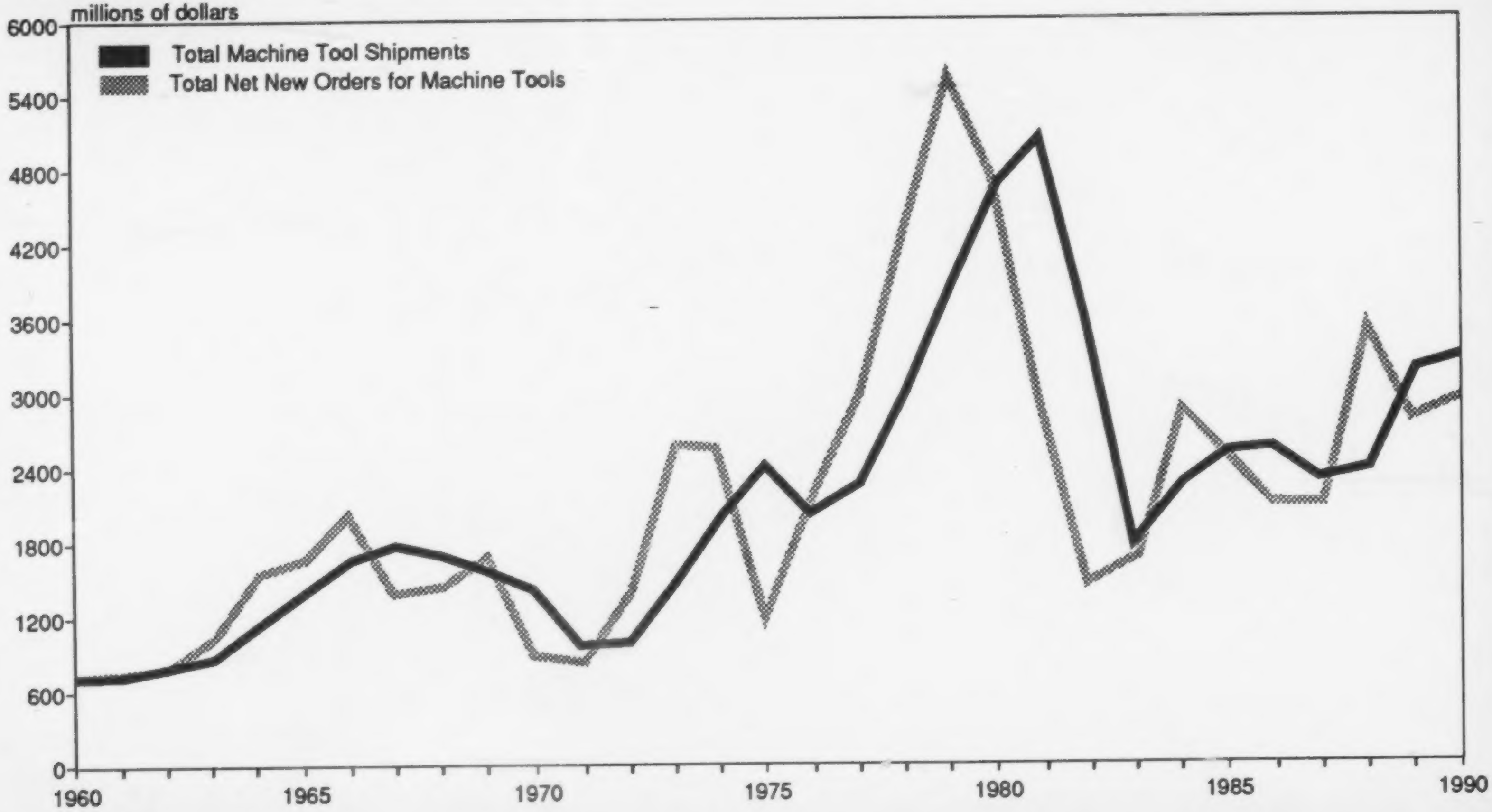
U.S. MACHINE TOOLS

Shipments and Net New Orders



Source: NMTBA Industry Estimates

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SHIPMENTS OF MACHINE TOOLS

1961 to 1990

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Year	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1961	$ 751	$ 522	$ 229	$ 541	$ 366	$ 175	$ 210	$ 156	$ 54
1962	821	606	215	613	450	163	208	156	52
1963	896	741	155	639	526	113	257	215	42
1964	1,164	959	205	845	679	166	319	280	39
1965	1,426	1,249	177	1,023	886	137	403	363	40
1966	1,685	1,535	150	1,222	1,098	124	463	437	26
1967	1,806	1,618	188	1,353	1,211	142	453	407	46
1968	1,727	1,563	164	1,358	1,238	120	369	325	44
1969	1,597	1,446	151	1,192	1,077	115	405	369	36
1970	1,443	1,239	204	993	827	166	450	412	38
1971	998	840	158	672	554	118	326	286	40
1972	1,019	894	124	714	627	87	304	267	37
1973	1,501	1,323	178	1,074	935	139	427	388	39
1974	2,031	1,763	267	1,445	1,241	205	585	522	63
1975	2,452	2,033	419	1,879	1,548	331	573	484	89
1976	2,060	1,744	316	1,482	1,270	212	578	474	104
1977	2,281	2,030	251	1,651	1,470	181	630	560	70
1978	3,013	2,689	325	2,189	1,960	228	825	729	96
1979	3,877	3,465	411	2,930	2,605	325	947	860	87
1980	4,692	4,084	608	3,681	3,206	475	1,011	878	133
1981	5,096	4,377	719	4,105	3,553	552	991	824	167
1982	3,604	3,198	406	2,895	2,599	296	710	600	110
1983	1,845	1,630	215	1,372	1,200	172	474	430	43
1984	2,286	2,093	193	1,607	1,484	123	679	609	71
1985	2,545	2,291	254	1,742	1,549	194	803	743	60
1986	2,579	2,306	272	1,890	1,685	206	688	621	67
1987	2,324	2,037	287	1,677	1,499	178	647	538	109
1988	2,399	2,102	297	1,575	1,400	174	825	702	122
1989	3,196	2,763	432	2,359	2,059	299	837	704	133
1990	3,300	2,856	444	2,330	2,004	325	970	851	119

Source: NMTBA Industry Estimates

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SHIPMENTS OF MACHINE TOOLS

Quarterly and Yearly, 1971–1975

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Quarter	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1971–1 qtr.	$ 274.80	$ 228.50	$ 46.30	$ 181.90	$ 142.90	$ 39.00	$ 92.90	$ 85.60	$ 7.30
2	266.25	228.35	37.90	185.05	154.20	30.85	81.20	74.15	7.05
3	208.10	173.00	35.10	145.10	120.30	24.80	63.00	52.70	10.30
4	248.75	209.95	38.80	160.25	136.80	23.45	88.50	73.15	15.35
Total	$ 997.90	$ 839.80	$ 158.10	$ 672.30	$ 554.20	$ 118.10	$325.60	$285.60	$ 40.00
1972–1 qtr.	$ 215.30	$ 183.75	$ 31.55	$ 142.75	$ 121.90	$ 20.85	$ 72.55	$ 61.85	$ 10.70
2	260.60	229.55	31.05	176.75	155.65	21.10	83.85	73.90	9.95
3	236.35	209.30	27.05	172.50	151.30	21.20	63.85	58.00	5.85
4	306.45	271.75	34.70	222.45	198.30	24.15	84.00	73.45	10.55
Total	$1,018.70	$ 894.35	$ 124.35	$ 714.45	$ 627.15	$ 87.30	$304.25	$ 267.20	$ 37.05
1973–1 qtr.	$ 330.55	$ 295.05	$ 35.50	$ 239.35	$ 209.95	$ 29.40	$ 91.20	$ 85.10	$ 6.10
2	390.70	347.50	43.20	279.80	243.75	36.05	110.90	103.75	7.15
3	345.60	296.65	48.95	245.30	207.45	37.85	100.30	89.20	11.10
4	434.15	383.90	50.25	309.30	273.90	35.40	124.85	110.00	14.85
Total	$1,501.00	$ 1,323.10	$ 177.90	$1,073.75	$ 935.05	$ 138.70	$427.25	$ 388.05	$ 39.20
1974–1 qtr.	$ 433.30	$ 378.55	$ 54.75	$ 309.25	$ 269.85	$ 39.40	$124.05	$ 108.70	$ 15.35
2	525.60	464.25	61.35	368.65	323.80	44.85	156.95	140.45	16.50
3	478.15	408.80	69.35	345.70	291.00	54.70	132.45	117.80	14.65
4	593.50	511.55	81.95	422.25	356.70	65.55	171.25	154.85	16.40
Total	$2,030.55	$ 1,763.15	$ 267.40	$1,445.85	$1,241.35	$ 204.50	$584.70	$ 521.80	$ 62.90
1975–1 qtr.	$ 636.25	$ 526.55	$ 109.70	$ 453.80	$ 375.40	$ 78.40	$182.45	$ 151.15	$ 31.30
2	656.15	554.75	101.40	528.00	443.45	84.55	128.15	111.30	16.85
3	566.80	467.15	99.65	440.90	361.85	79.05	125.90	105.30	20.60
4	592.50	484.15	108.35	455.95	367.40	88.55	136.55	116.75	19.80
Total	$2,451.70	$ 2,032.60	$ 419.10	$1,878.65	$1,548.10	$ 330.55	$573.05	$ 484.50	$ 88.55

Source: NMTBA industry Estimates

SHIPMENTS OF MACHINE TOOLS

Quarterly and Yearly, 1976–1980

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Quarter	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1976–1 qtr.	$ 531.85	$ 446.55	$ 85.30	$ 392.65	$ 334.15	$ 58.50	$139.20	$ 112.40	$ 26.80
2	517.85	425.40	92.45	367.85	302.10	65.75	150.00	123.30	26.70
3	460.35	393.45	66.90	329.35	284.85	45.10	130.40	108.60	21.80
4	549.60	477.95	71.65	391.65	348.75	42.90	157.95	129.20	28.75
Total	$2,059.65	$ 1,743.35	$ 316.30	$1,482.10	$1,269.85	$ 212.25	$577.55	$ 473.50	$104.05
1977–1 qtr.	$ 496.90	$ 433.80	$ 63.10	$ 336.10	$ 297.55	$ 38.55	$160.80	$ 136.25	$ 24.55
2	584.70	526.30	58.40	410.80	365.65	45.15	173.90	160.65	13.25
3	524.05	476.00	48.05	395.15	359.30	35.85	128.90	116.70	12.20
4	675.10	594.10	81.00	508.75	447.35	61.40	166.35	146.75	19.60
Total	$2,280.75	$ 2,030.20	$ 250.55	$1,650.80	$1,469.85	$ 180.95	$629.95	$ 560.35	$ 69.60
1978–1 qtr.	$ 683.20	$ 620.90	$ 62.30	$ 503.85	$ 459.65	$ 44.20	$ 179.35	$ 161.25	$ 18.10
2	791.60	712.55	79.05	584.20	526.95	57.25	207.40	185.60	21.80
3	687.55	609.80	77.75	498.05	438.85	59.20	189.50	170.95	18.55
4	851.10	745.35	105.75	602.40	534.65	67.75	248.70	210.70	38.00
Total	$3,013.45	$2,688.60	$ 324.85	$2,188.50	$1,960.10	$ 228.40	$ 824.95	$ 728.50	$ 96.45
1979–1 qtr.	$ 858.05	$ 769.75	$ 88.30	$ 633.45	$ 564.45	$ 69.00	$ 224.60	$ 205.30	$ 19.30
2	978.20	869.05	109.15	735.75	648.10	87.65	242.45	220.95	21.50
3	899.85	802.80	97.05	689.85	611.35	78.50	210.00	191.45	18.55
4	1,140.45	1,023.70	116.75	871.00	781.60	89.40	269.45	242.10	27.35
Total	$3,876.55	$3,465.30	$ 411.25	$2,930.05	$2,605.50	$ 324.55	$ 946.50	$ 859.80	$ 86.70
1980–1 qtr.	$1,146.15	$1,030.45	$ 115.70	$ 881.40	$ 794.65	$ 86.75	$ 264.75	$ 235.80	$ 28.95
2	1,193.30	1,037.75	155.55	925.35	802.50	122.85	267.95	235.25	32.70
3	1,049.05	915.20	133.85	830.45	727.80	102.65	218.60	187.40	31.20
4	1,303.25	1,100.85	202.40	1,043.60	881.05	162.55	259.65	219.80	39.85
Total	$4,691.75	$4,084.25	$ 607.50	$3,680.80	$3,206.00	$ 474.80	$1,010.95	$ 878.25	$ 132.70

Source: NMTBA Industry Estimates

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SHIPMENTS OF MACHINE TOOLS

Quarterly and Yearly, 1981–1985

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Quarter	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1981–1 qtr.	$1,288.20	$1,077.40	$ 210.80	$1,017.85	$ 862.25	$ 155.60	$ 270.35	$ 215.15	$ 55.20
2	1,367.50	1,131.15	236.35	1,103.40	917.95	185.45	264.10	213.20	50.90
3	1,133.95	1,006.00	127.95	920.30	820.35	99.95	213.65	185.65	28.00
4	1,305.95	1,162.10	143.85	1,062.95	951.90	111.05	243.00	210.20	32.80
Total	$5,095.60	$4,376.65	$ 718.95	$4,104.50	$3,552.45	$ 552.05	$ 991.10	$ 824.20	$ 166.90
1982–1 qtr.	$1,154.20	$1,041.55	$ 112.65	$ 933.05	$ 861.30	$ 71.75	$ 221.15	$ 180.25	$ 40.90
2	1,008.45	911.85	96.60	810.65	735.30	75.35	197.80	176.55	21.25
3	783.40	676.20	107.20	640.45	550.70	89.75	142.95	125.50	17.45
4	658.35	568.75	89.60	510.60	451.30	59.30	147.75	117.45	30.30
Total	$3,604.40	$3,198.35	$ 406.05	$2,894.75	$2,598.60	$ 296.15	$ 709.65	$ 599.75	$ 109.90
1983–1 qtr.	$ 487.45	$ 430.80	$ 56.65	$ 370.60	$ 329.80	$ 40.80	$ 116.85	$ 101.00	$ 15.85
2	469.65	411.35	58.30	357.50	308.20	49.30	112.15	103.15	9.00
3	357.05	314.15	42.90	252.35	220.15	32.20	104.70	94.00	10.70
4	530.90	473.75	57.15	391.05	341.45	49.60	139.85	132.30	7.55
Total	$1,845.05	$1,630.05	$ 215.00	$1,371.50	$1,199.60	$ 171.90	$ 473.55	$ 430.45	$ 43.10
1984–1 qtr.	$ 449.50	$ 408.95	$ 40.55	$ 298.10	$ 273.00	$ 25.10	$ 151.40	$ 135.95	$ 15.45
2	572.30	521.60	50.70	401.80	373.55	28.25	170.50	148.05	22.45
3	568.85	527.00	41.85	401.55	377.25	24.30	167.30	149.75	17.55
4	695.20	635.05	60.15	505.05	460.05	45.00	190.15	175.00	15.15
Total	$2,285.85	$2,092.60	$ 193.25	$1,606.50	$1,483.85	$ 122.65	$ 679.35	$ 608.75	$ 70.60
1985–1 qtr.	$ 531.70	$ 482.75	$ 48.95	$ 357.05	$ 319.90	$ 37.15	$ 174.65	$ 162.85	$ 11.80
2	586.05	548.35	37.70	385.00	357.55	27.45	201.05	190.80	10.25
3	654.65	596.40	58.25	443.05	407.10	35.95	211.60	189.30	22.30
4	772.80	663.95	108.85	557.15	463.95	93.20	215.65	200.00	15.65
Total	$2,545.20	$2,291.45	$ 253.75	$1,742.25	$1,548.50	$ 193.75	$ 802.95	$ 742.95	$ 60.00

Source: NMTBA Industry Estimates

SHIPMENTS OF MACHINE TOOLS *Quarterly and Yearly, 1986–1991*

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Quarter	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1986–1 qtr.	$ 597.30	$ 529.80	$ 67.50	$ 386.95	$ 331.75	$ 55.20	$ 210.35	$ 198.05	$ 12.30
2	751.00	686.90	64.10	569.35	519.85	49.50	181.65	167.05	14.60
3	549.35	485.15	64.20	418.70	369.20	49.50	130.65	115.95	14.70
4	680.85	604.20	76.65	515.30	463.90	51.40	165.55	140.30	25.25
Total	$2,578.50	$2,306.05	$ 272.45	$1,890.30	$1,684.70	$ 205.60	$ 688.20	$ 621.35	$ 66.85
1987–1 qtr.	$ 476.80	$ 420.85	$ 55.95	$ 349.15	$ 311.10	$ 38.05	$ 127.65	$ 109.75	$ 17.90
2	614.10	542.80	71.30	442.60	396.30	46.30	171.50	146.50	25.00
3	556.65	490.35	66.30	397.75	354.40	43.35	158.90	135.95	22.95
4	676.10	582.75	93.35	487.00	437.05	49.95	189.10	145.70	43.40
Total	$2,323.65	$2,036.75	$ 286.90	$1,676.50	$1,498.85	$ 177.65	$ 547.15	$ 537.90	$ 109.25
1988–1 qtr.	$ 516.50	$ 456.50	$ 60.00	$ 317.85	$ 282.55	$ 35.30	$ 198.65	$ 173.95	$ 24.70
2	551.15	476.75	74.40	339.35	298.45	40.90	211.80	178.30	33.50
3	569.20	502.85	66.35	391.30	352.65	38.65	177.90	150.20	27.70
4	762.25	666.20	96.05	526.05	466.45	59.60	236.20	199.75	36.45
Total	$2,399.10	$2,102.30	$ 296.80	$1,574.55	$1,400.10	$ 174.45	$ 824.55	$ 702.20	$ 122.35
1989–1 qtr.	$ 687.65	$ 606.25	$ 81.40	$ 481.55	$ 430.65	$ 50.90	$ 206.10	$ 175.60	$ 30.50
2	817.85	716.70	101.15	578.15	513.70	64.45	239.70	203.00	36.70
3	745.50	636.15	109.35	574.00	491.40	82.60	171.50	144.75	26.75
4	944.60	804.25	140.35	724.90	623.45	101.45	219.70	180.80	38.90
Total	$3,195.60	$2,763.35	$ 432.25	$2,358.60	$2,059.20	$ 299.40	$ 837.00	$ 704.15	$ 132.85
1990–1 qtr.	$ 783.25	$ 678.60	$ 104.65	$ 545.85	$ 466.80	$ 79.05	$ 237.40	$ 211.80	$ 25.60
2	881.30	772.60	108.70	638.80	554.05	84.75	242.50	218.55	23.95
3	763.65	671.10	92.55	507.50	448.15	59.35	256.15	222.95	33.20
4	871.70	733.25	138.45	637.45	535.45	102.00	234.25	197.80	36.45
Total	$3,299.90	$2,855.55	$ 444.35	$2,329.60	$2,004.45	$ 325.15	$ 970.30	$ 851.10	$ 119.20
1991–1 qtr.	$ 661.55	557.30	104.25	417.80	351.45	66.35	243.75	205.85	37.90
2	651.00	526.85	124.15	461.75	388.05	73.70	189.25	138.80	50.45

Source: NMTBA Industry Estimates

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SHIPMENTS OF MACHINE TOOLS

Monthly, 1986–1987

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Month	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1986									
January	$145.85	$124.85	$21.00	$ 91.50	$ 74.05	$17.45	$54.35	$50.80	$ 3.55
February	202.65	185.65	17.00	123.90	109.50	14.40	78.75	76.15	2.60
March	248.80	219.30	29.50	171.55	148.20	23.35	77.25	71.10	6.15
April	209.55	190.80	18.75	152.10	140.05	12.05	57.45	50.75	6.70
May	229.55	207.10	22.45	172.45	153.10	19.35	57.10	54.00	3.10
June	311.90	289.00	22.90	244.80	226.70	18.10	67.10	62.30	4.80
July	190.05	172.50	17.55	149.10	135.90	13.20	40.95	36.60	4.35
August	151.35	131.55	19.80	108.25	92.50	15.75	43.10	39.05	4.05
September	207.95	181.10	26.85	161.35	140.80	20.55	46.60	40.30	6.30
October	242.80	222.80	20.00	183.50	170.40	13.10	59.30	52.40	6.90
November	166.80	149.10	17.70	116.80	104.40	12.40	50.00	44.70	5.30
December	271.25	232.30	38.95	215.00	189.10	25.90	56.25	43.20	13.05
1987									
January	147.70	135.35	12.35	111.25	104.10	7.15	36.45	31.25	5.20
February	146.60	131.45	15.15	99.25	88.80	10.45	47.35	42.65	4.70
March	182.50	154.05	28.45	138.65	118.20	20.45	43.85	35.85	8.00
April	172.35	150.15	22.20	115.85	102.10	13.75	56.50	48.05	8.45
May	208.60	189.80	18.80	161.65	146.00	15.65	46.95	43.80	3.15
June	233.15	202.85	30.30	165.10	148.20	16.90	68.05	54.65	13.40
July	197.80	182.25	15.55	136.30	127.90	8.40	61.50	54.35	7.15
August	158.40	133.45	24.95	118.35	99.85	18.50	40.05	33.60	6.45
September	200.45	174.65	25.80	143.10	126.65	16.45	57.35	48.00	9.35
October	209.65	181.20	28.45	134.85	117.95	16.90	74.80	63.25	11.55
November	178.05	148.60	29.45	125.95	110.20	15.75	52.10	38.40	13.70
December	288.40	252.95	35.45	226.20	208.90	17.30	62.20	44.05	18.15

Source: NMTBA Industry Estimates

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SHIPMENTS OF MACHINE TOOLS

Monthly, 1988–1989

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Month	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1988									
January	$143.35	$125.65	$17.70	$ 71.20	$ 61.60	$ 9.60	$72.15	$64.05	$8.10
February	166.45	145.10	21.35	108.90	97.00	11.90	57.55	48.10	9.45
March	206.70	185.75	20.95	137.75	123.95	13.80	68.95	61.80	7.15
April	157.40	133.90	23.50	95.30	82.20	13.10	62.10	51.70	10.40
May	179.70	157.60	22.10	111.25	100.25	11.00	68.45	57.35	11.10
June	214.05	185.25	28.80	132.80	116.00	16.80	81.25	69.25	12.00
July	187.70	169.90	17.80	134.70	126.15	8.55	53.00	43.75	9.25
August	153.95	133.75	20.20	105.40	93.00	12.40	48.55	40.75	7.80
September	227.55	199.20	28.35	151.20	133.50	17.70	76.35	65.70	10.65
October	212.15	178.65	33.50	145.90	123.35	22.55	66.25	55.30	10.95
November	257.55	236.85	20.70	170.80	156.70	14.10	86.75	80.15	6.60
December	292.55	250.70	41.85	209.35	186.40	22.95	83.20	64.30	18.90
1989									
January	152.20	131.70	20.50	102.85	89.50	13.35	49.35	42.20	7.15
February	228.80	200.30	28.50	151.25	133.90	17.35	77.55	66.40	11.15
March	306.65	274.25	32.40	227.45	207.25	20.20	79.20	67.00	12.20
April	249.55	227.15	22.40	184.05	168.35	15.70	65.50	58.80	6.70
May	240.75	219.50	21.25	158.40	145.40	13.00	82.35	74.10	8.25
June	327.55	270.05	57.50	235.70	199.95	35.75	91.85	70.10	21.75
July	237.70	206.00	31.70	175.60	155.45	20.15	62.10	50.55	11.55
August	225.80	196.95	28.85	169.90	147.20	22.70	55.90	49.75	6.15
September	282.00	233.20	48.80	228.50	188.75	39.75	53.50	44.45	9.05
October	251.55	220.75	30.80	183.55	161.95	21.60	68.00	58.80	9.20
November	313.70	265.25	48.45	228.60	201.10	27.50	85.10	64.15	20.95
December	379.35	318.25	61.10	312.75	260.40	52.35	66.60	57.85	8.75

Source: NMTBA Industry Estimates

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SHIPMENTS OF MACHINE TOOLS

Monthly, 1990–1991

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Month	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1990									
January	$226.35	$199.05	$27.30	$162.20	$143.40	$18.80	$64.15	$55.65	$ 8.50
February	268.00	233.30	34.70	169.50	143.60	25.90	98.50	89.70	8.80
March	288.90	246.25	42.65	214.15	179.80	34.35	74.75	66.45	8.30
April	258.10	218.35	39.75	168.95	141.65	27.30	89.15	76.70	12.45
May	272.95	243.30	29.65	194.15	172.30	21.85	78.80	71.00	7.80
June	350.25	310.95	39.30	275.70	240.10	35.60	74.55	70.85	3.70
July	233.40	211.35	22.05	161.80	144.00	17.80	71.60	67.35	4.25
August	231.35	197.15	34.20	155.75	135.85	19.90	75.60	61.30	14.30
September	298.90	262.60	36.30	189.95	168.30	21.65	108.95	94.30	14.65
October	253.75	222.10	31.65	188.80	164.90	23.90	64.95	57.20	7.75
November	267.45	224.00	43.45	182.20	160.60	21.60	85.25	63.40	21.85
December	350.50	287.15	63.35	266.45	209.95	56.50	84.05	77.20	6.85
1991									
January	182.55	154.25	28.30	110.80	93.25	17.55	71.75	61.00	10.75
February	202.15	168.25	33.90	133.15	109.45	23.70	69.00	58.80	10.20
March	276.85	234.80	42.05	173.85	148.75	25.10	103.00	86.05	16.95
April	207.05	173.60	33.45	145.35	126.55	18.80	61.70	47.05	14.65
May	231.85	201.85	30.00	173.85	157.25	16.60	58.00	44.60	13.40
June	212.10	151.40	60.70	142.55	104.25	38.30	69.55	47.15	22.40

Source: NMTBA Industry Estimates

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NET NEW ORDERS OF MACHINE TOOLS

1961 to 1990

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Year	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1961	$ 772	$ 536	$ 236	$ 591	$ 401	$ 190	$ 181	$ 135	$ 46
1962	815	661	154	571	468	103	244	193	51
1963	1,061	869	192	760	607	153	301	262	39
1964	1,577	1,348	229	1,038	861	177	539	487	52
1965	1,692	1,532	160	1,251	1,122	129	441	410	31
1966	2,074	1,884	190	1,629	1,483	146	445	401	44
1967	1,420	1,272	148	1,134	1,024	110	286	248	38
1968	1,474	1,320	154	1,080	960	120	394	360	34
1969	1,728	1,517	211	1,195	1,033	162	533	484	49
1970	912	733	179	651	507	144	261	226	35
1971	861	747	114	609	524	85	252	223	29
1972	1,412	1,245	167	1,009	877	132	403	368	35
1973	2,613	2,268	345	1,825	1,550	275	787	717	70
1974	2,583	2,185	398	2,017	1,716	301	566	470	96
1975	1,277	1,064	213	916	781	135	361	284	77
1976	2,203	1,961	242	1,662	1,477	185	541	485	56
1977	2,995	2,709	286	2,202	1,981	221	793	729	64
1978	4,349	3,944	405	3,375	3,043	332	973	901	72
1979	5,621	4,856	765	4,495	3,866	629	1,126	991	135
1980	4,754	4,239	515	3,885	3,496	389	870	744	126
1981	2,945	2,563	382	2,228	1,946	282	717	617	100
1982	1,498	1,261	236	1,064	890	175	433	372	62
1983	1,696	1,558	138	1,152	1,069	82	545	489	56
1984	2,916	2,631	285	1,916	1,700	216	1,000	932	69
1985	2,528	2,262	266	1,853	1,652	201	675	610	65
1986	2,125	1,883	242	1,544	1,377	168	581	507	74
1987	2,119	1,831	288	1,451	1,294	157	667	536	131
1988	3,591	3,065	526	2,708	2,316	392	883	749	134
1989	2,808	2,442	366	1,977	1,723	254	832	719	113
1990	2,965	2,533	432	2,070	1,772	298	894	761	134

Source: NMTBA Industry Estimates

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NET NEW ORDERS OF MACHINE TOOLS

Quarterly and Yearly, 1971–1975

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Quarter	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1971–1 qtr.	$ 181.55	$ 151.00	$ 30.55	$ 118.75	$ 95.50	$ 23.25	$ 62.80	$ 55.50	$ 7.30
2	212.40	182.25	30.15	153.35	128.80	24.55	59.05	53.45	5.60
3	231.55	204.10	27.45	165.40	144.50	20.90	66.15	59.60	6.55
4	235.65	209.95	25.70	171.25	155.30	15.95	64.40	54.65	9.75
Total	$ 861.15	$ 747.30	$ 113.85	$ 608.75	$ 524.10	$ 84.65	$252.40	$ 223.20	$ 29.20
1972–1 qtr.	$ 275.60	$ 242.05	$ 33.55	$ 207.65	$ 180.55	$ 27.10	$ 67.95	$ 61.50	$ 6.45
2	319.65	284.75	34.90	222.15	193.80	28.35	97.50	90.95	6.55
3	353.10	301.55	51.55	253.70	210.90	42.80	99.40	90.65	8.75
4	463.65	417.10	46.55	325.45	292.00	33.45	138.20	125.10	13.10
Total	$1,412.00	$1,245.45	$ 166.55	$1,008.95	$ 877.25	$ 131.70	$403.05	$ 368.20	$ 34.85
1973–1 qtr.	$ 632.00	$ 558.15	$ 73.85	$ 426.00	$ 370.15	$ 55.85	$206.00	$ 188.00	$ 18.00
2	678.10	610.55	67.55	448.00	395.45	52.55	230.10	215.10	15.00
3	600.10	512.85	87.25	427.35	358.45	68.90	172.75	154.40	18.35
4	702.45	586.05	116.40	524.10	426.35	97.75	178.35	159.70	18.65
Total	$2,612.65	$2,267.60	$ 345.05	$1,825.45	$1,550.40	$ 275.05	$787.20	$ 717.20	$ 70.00
1974–1 qtr.	$ 752.20	$ 644.50	$ 107.70	$ 597.85	$ 509.75	$ 88.10	$154.35	$ 134.75	$ 19.60
2	847.85	737.95	109.90	676.20	592.55	83.65	171.65	145.40	26.25
3	631.50	536.30	95.20	465.00	394.10	70.90	166.50	142.20	24.30
4	351.50	266.50	85.00	278.00	219.25	58.75	73.50	47.25	26.25
Total	$2,583.05	$2,185.25	$ 397.80	$2,017.05	$1,715.65	$ 301.40	$566.00	$ 469.60	$ 96.40
1975–1 qtr.	$ 237.60	$ 188.35	$ 49.25	$ 176.25	$ 147.70	$ 28.55	$ 61.35	$ 40.65	$ 20.70
2	345.75	276.80	68.95	240.85	201.05	39.80	104.90	75.75	29.15
3	340.45	293.75	46.70	241.35	209.[illegible]0	31.75	99.10	84.15	14.95
4	352.95	305.15	47.80	257.45	222.15	35.30	95.50	83.00	12.50
Total	$1,276.75	$1,064.05	$ 212.70	$ 915.90	$ 780.50	$ 135.40	$360.85	$ 283.55	$ 77.30

Source: NMTBA Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS *Quarterly and Yearly, 1976–1980*

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Quarter	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1976–1 qtr.	$ 413.30	$ 354.50	$ 58.80	$ 305.75	$ 259.95	$ 45.80	$107.55	$ 94.55	$ 13.00
2	496.60	452.70	43.90	354.05	322.70	31.35	142.55	130.00	12.55
3	597.30	527.80	69.50	439.40	383.50	55.90	157.90	144.30	13.60
4	696.00	626.45	69.55	562.95	510.45	52.50	133.05	116.00	17.05
Total	$2,203.20	$1,961.45	$ 241.75	$1,662.15	$1,476.60	$ 185.55	$541.05	$ 484.85	$ 56.20
1977–1 qtr.	$ 667.45	$ 603.90	$ 63.55	$ 489.00	$ 443.85	$ 45.15	$178.45	$ 160.05	$ 18.40
2	770.55	692.25	78.30	583.70	522.60	61.10	186.85	169.65	17.20
3	725.85	650.70	75.15	496.20	435.30	60.90	229.65	215.40	14.25
4	831.50	762.80	68.70	633.15	578.95	54.20	198.35	183.85	14.50
Total	$2,995.35	$2,709.65	$ 285.70	$2,202.05	$1,980.70	$ 221.35	$793.30	$ 728.95	$ 64.35
1978–1 qtr.	$ 940.05	$ 847.30	$ 92.75	$ 723.85	$ 646.25	$ 77.60	$ 216.20	$ 201.05	$ 15.15
2	1,129.95	1,013.25	116.70	886.55	789.55	97.00	243.40	223.70	19.70
3	1,027.65	953.85	73.80	776.95	720.70	56.25	250.70	233.15	17.55
4	1,250.85	1,129.70	121.15	988.10	886.65	101.45	262.75	243.05	19.70
Total	$4,348.50	$3,944.10	$ 404.40	$3,375.45	$3,043.15	$ 332.30	$ 973.05	$ 900.95	$ 72.10
1979–1 qtr.	$1,471.40	$1,322.80	$ 148.60	$1,158.25	$1,031.55	$ 126.70	$ 313.15	$ 291.25	$ 21.90
2	1,356.45	1,189.00	167.45	1,083.55	963.30	120.25	272.90	225.70	47.20
3	1,353.20	1,171.85	181.35	1,120.50	969.40	151.10	232.70	202.45	30.25
4	1,440.40	1,172.85	267.55	1,132.80	901.55	231.25	307.60	271.30	36.30
Total	$5,621.45	$4,856.50	$ 764.95	$4,495.10	$3,865.80	$ 629.30	$1,126.35	$ 990.70	$135.65
1980–1 qtr.	$1,517.45	$1,331.95	$ 185.50	$1,207.80	$1,057.90	$ 149.90	$ 309.65	$ 274.05	$ 35.60
2	1,335.35	1,210.05	125.30	1,142.10	1,054.30	87.80	193.25	155.75	37.50
3	917.50	825.35	92.15	728.30	659.05	69.25	189.20	166.30	22.90
4	984.00	872.20	111.80	806.55	724.25	82.30	177.45	147.95	29.50
Total	$4,754.30	$4,239.55	$ 514.75	$3,884.75	$3,495.50	$ 389.25	$ 869.55	$ 744.05	$ 125.50

Source: NMTBA Industry Estimates

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NET NEW ORDERS FOR MACHINE TOOLS

Quarterly and Yearly, 1981–1985

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1981–1 qtr.	$ 920.35	$ 809.95	$ 110.40	$ 706.60	$ 615.25	$ 91.35	$ 213.75	$ 194.70	$ 19.05
2	867.00	723.60	143.40	661.20	559.95	101.25	205.80	163.65	42.15
3	593.45	530.65	62.80	455.25	408.10	47.15	138.20	122.55	15.65
4	564.05	498.45	65.60	405.05	362.50	42.55	159.00	135.95	23.05
Total	$2,944.85	$2,562.65	$ 382.20	$2,228.10	$1,945.80	$ 282.30	$ 716.75	$ 616.85	$ 99.90
1982–1 qtr.	$ 506.80	$ 432.30	$ 74.50	$ 384.85	$ 328.40	$ 56.45	$ 121.95	$ 103.90	$ 18.05
2	382.65	303.05	79.60	274.75	216.45	58.30	107.90	86.60	21.30
3	279.95	237.30	42.65	183.45	154.00	29.45	96.50	83.30	13.20
4	328.35	288.70	39.65	221.40	190.75	30.65	106.95	97.95	9.00
Total	$1,497.75	$ 1,261.35	$ 236.40	$1,064.45	$ 889.60	$ 174.85	$ 433.30	$ 371.75	$ 61.55
1983–1 qtr.	$ 314.85	$ 285.55	$ 29.30	$ 224.10	$ 205.85	$ 18.25	$ 90.75	$ 79.70	$ 11.05
2	399.10	366.70	32.40	269.30	250.30	19.00	129.80	116.40	13.40
3	468.15	439.45	28.70	322.20	305.90	16.30	145.95	133.55	12.40
4	514.05	466.50	47.55	336.05	307.40	28.65	178.00	159.10	18.90
Total	$1,696.15	$1,558.20	$ 137.95	$1,151.65	$1,069.45	$ 82.20	$ 544.50	$ 488.75	$ 55.75
1984–1 qtr.	$ 600.45	$ 551.90	$ 48.55	$ 412.75	$ 376.10	$ 36.65	$ 187.70	$ 175.80	$ 11.90
2	764.40	654.65	109.75	499.20	410.75	88.45	265.20	243.90	21.30
3	800.20	734.95	65.25	493.00	439.15	53.85	307.20	295.80	11.40
4	750.75	689.55	61.20	510.85	473.55	37.30	239.90	216.00	23.90
Total	$2,915.80	$2,631.05	$ 284.75	$1,915.80	$1,699.55	$ 216.25	$1,000.00	$ 931.50	$ 68.50
1985–1 qtr.	$ 728.25	$ 663.25	$ 65.00	$ 528.50	$ 475.50	$ 53.00	$ 199.65	$ 187.65	$ 12.00
2	641.40	582.45	58.95	475.70	430.15	45.55	165.70	152.30	13.40
3	558.45	465.35	93.10	404.75	338.80	65.95	153.70	126.55	27.15
4	600.00	551.10	48.90	444.15	407.70	36.45	155.85	143.40	12.45
Total	$2,528.10	$2,262.15	$ 265.95	$1,853.10	$1,652.15	$ 200.95	$ 675.00	$ 610.00	$ 65.00

Source: NMTBA Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

Quarterly and Yearly, 1986–1991

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Quarter	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1986–1 qtr.	$ 615.75	$ 570.00	$ 45.75	$ 463.50	$ 431.45	$ 32.05	$ 152.25	$ 138.55	$ 13.70
2	600.60	536.80	63.80	434.65	382.45	52.20	165.95	154.35	11.60
3	459.65	387.90	71.75	344.05	297.80	46.25	115.60	90.10	25.50
4	449.30	388.65	60.65	302.05	264.85	37.20	147.25	123.80	23.45
Total	$2,125.30	$1,883.35	$ 241.95	$1,544.25	$1,376.55	$ 167.70	$ 581.05	$ 506.80	$ 74.25
1987–1 qtr.	$ 463.70	$ 396.25	$ 67.45	$ 326.10	$ 291.55	$ 34.55	$ 137.60	$ 104.70	$ 32.90
2	521.15	463.55	57.60	339.30	303.60	35.70	181.85	159.95	21.90
3	487.85	412.45	75.40	324.55	291.60	32.95	163.30	120.85	42.45
4	646.10	558.25	87.85	461.50	407.70	53.80	184.60	150.55	34.05
Total	$2,118.80	$1,830.50	$ 288.30	$1,451.45	$1,294.45	$ 157.00	$ 667.35	$ 536.05	$ 131.30
1988–1 qtr.	$ 850.00	$ 746.95	$ 103.05	$ 666.25	$ 597.85	$ 68.40	$ 183.75	$ 149.10	$ 34.65
2	960.50	817.60	142.90	676.50	562.75	113.75	284.00	254.85	29.15
3	922.65	778.75	143.90	715.00	599.80	115.20	207.65	178.95	28.70
4	857.70	721.80	135.90	650.15	555.35	94.80	207.55	166.45	41.10
Total	$3,590.85	$3,065.10	$ 525.75	$2,707.90	$2,315.75	$ 392.15	$ 882.95	$ 749.35	$ 133.60
1989–1 qtr.	$ 803.30	$ 708.75	$ 94.55	$ 602.55	$ 536.90	$ 65.65	$ 200.75	$ 171.85	$ 28.90
2	688.50	598.75	89.75	459.55	399.65	59.90	228.95	199.10	29.85
3	720.45	626.00	94.45	481.90	407.20	74.70	238.55	218.80	19.75
4	595.70	508.35	87.35	432.35	379.05	53.30	163.35	129.30	34.05
Total	$2,807.95	$2,441.85	$ 366.10	$1,976.35	$1,722.80	$ 253.55	$ 831.60	$ 719.05	$ 112.55
1990–1 qtr.	$ 661.70	$ 505.90	$ 155.80	$ 455.65	$ 350.75	$ 104.90	$ 206.05	$ 155.15	$ 50.90
2	760.95	667.10	93.85	533.05	455.45	77.60	227.90	211.65	16.25
3	775.40	710.75	64.65	584.45	535.50	48.95	190.95	175.25	15.70
4	766.65	648.75	117.90	497.15	430.25	66.90	269.50	218.50	51.00
Total	$2,964.70	$2,532.50	$ 432.20	$2,070.30	$1,771.95	$298.35	$ 894.40	$ 760.55	$ 133.85
1991–1 qtr.	$ 650.45	490.75	159.70	469.85	348.20	121.65	180.60	142.55	38.05
2	519.60	391.55	128.05	376.90	294.05	82.85	142.70	97.50	45.20

Source: NMTBA Industry Estimates

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NET NEW ORDERS OF MACHINE TOOLS

Monthly, 1986–1987

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Month	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1986									
January	$190.75	$174.95	$15.80	$135.00	$124.75	$10.25	$55.75	$50.20	$ 5.55
February	210.40	198.25	12.15	168.60	160.65	7.95	41.80	37.60	4.20
March	214.60	196.80	17.80	159.90	146.05	13.85	54.70	50.75	3.95
April	193.25	169.25	24.00	136.15	118.30	17.85	57.10	50.95	6.15
May	206.20	177.00	29.20	141.70	118.50	23.20	64.50	58.50	6.00
June	201.15	190.55	10.60	156.80	145.65	11.15	44.35	44.90	–0.55
July	170.00	135.30	34.70	128.80	99.25	29.55	41.20	36.05	5.15
August	154.40	139.00	15.40	115.10	108.60	6.50	39.30	30.40	8.90
September	135.25	113.60	21.65	100.15	89.95	10.20	35.10	23.65	11.45
October	180.15	159.40	20.75	130.85	114.95	15.90	49.30	44.45	4.85
November	132.60	118.15	14.45	83.95	75.85	8.10	48.65	42.30	6.35
December	136.55	111.10	25.45	87.25	74.05	13.20	49.30	37.05	12.25
1987									
January	146.65	118.55	28.10	98.95	85.65	13.30	47.70	32.90	14.80
February	152.85	141.45	11.40	103.70	98.35	5.35	49.15	43.10	6.05
March	164.20	136.25	27.95	123.45	107.55	15.90	40.75	28.70	12.05
April	130.30	110.15	20.15	79.55	65.15	14.40	50.75	45.00	5.75
May	188.10	176.10	12.00	144.80	139.60	5.20	43.30	36.50	6.80
June	202.75	177.30	25.45	114.95	98.85	16.10	87.80	78.45	9.35
July	163.00	128.50	34.50	102.10	84.60	17.50	60.90	43.90	17.00
August	142.00	126.85	15.15	96.35	90.25	6.10	45.65	36.60	9.05
September	182.85	157.10	25.75	126.10	116.75	9.35	56.75	40.35	16.40
October	267.40	246.70	20.70	198.15	187.15	11.00	69.25	59.55	9.70
November	137.30	102.10	35.20	89.10	65.75	23.35	48.20	36.35	11.85
December	241.40	209.45	31.95	174.25	154.80	19.45	67.15	54.65	12.50

Source: NMTBA Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

Monthly, 1988–1989

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Month	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1988									
January	$297.50	$266.05	$31.45	$223.95	$205.75	$18.20	$73.55	$60.30	$13.25
February	298.05	258.85	39.20	250.40	217.95	32.45	47.65	40.90	6.75
March	254.45	222.05	32.40	191.90	174.15	17.75	62.55	47.90	14.65
April	253.00	193.45	59.55	195.30	146.45	48.45	57.70	47.00	10.70
May	324.70	278.90	45.80	242.85	205.65	37.20	81.85	73.25	8.60
June	382.80	345.25	37.55	238.35	210.65	27.70	144.45	134.60	9.85
July	254.95	221.35	33.60	187.00	167.55	19.45	67.95	53.80	14.15
August	339.50	252.80	86.70	261.50	179.30	82.20	78.00	73.50	4.50
September	328.20	304.60	23.60	266.50	252.95	13.55	61.70	51.65	10.05
October	262.25	239.25	23.00	215.40	199.25	16.15	46.85	40.00	6.85
November	279.00	230.85	48.15	188.35	164.60	23.75	90.65	66.25	24.40
December	316.45	251.70	64.75	246.40	191.50	54.90	70.05	60.20	9.85
1989									
January	230.85	202.00	28.85	167.00	145.40	21.60	63.85	56.60	7.25
February	281.95	248.35	33.60	214.95	191.30	23.65	67.00	57.05	9.95
March	290.50	258.40	32.10	220.60	200.20	20.40	69.90	58.20	11.70
April	242.55	214.90	27.65	152.80	138.50	14.30	89.75	76.40	13.35
May	205.25	187.95	17.30	147.90	138.10	9.80	57.35	49.85	7.50
June	240.70	195.90	44.80	158.85	123.05	35.80	81.85	72.85	9.00
July	190.75	155.35	35.40	133.20	112.00	21.20	57.55	43.35	14.20
August	227.10	191.15	35.95	156.25	120.70	35.55	70.85	70.45	0.40
September	302.60	279.50	23.10	192.45	174.50	17.95	110.15	105.00	5.15
October	205.00	182.75	22.25	144.90	135.70	9.20	60.10	47.05	13.05
November	184.40	148.20	36.20	128.90	108.15	20.75	55.50	40.05	15.45
December	206.30	177.40	28.90	158.55	135.20	23.35	47.75	42.20	5.55

Source: NMTBA Industry Estimates

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NET NEW ORDERS OF MACHINE TOOLS

Monthly, 1990–1991

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Month	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1990									
January	$201.30	$159.20	$42.10	$141.15	$117.70	$23.45	$ 60.15	$ 41.50	$18.65
February	194.55	157.15	37.40	116.30	100.45	15.85	78.25	56.70	21.55
March	265.85	189.55	76.30	198.20	132.60	65.60	67.65	56.95	10.70
April	289.25	264.70	24.55	206.65	187.45	19.20	82.60	77.25	5.35
May	206.45	181.30	25.15	137.80	116.80	21.00	68.65	64.50	4.15
June	262.25	221.10	44.15	188.60	151.20	37.40	76.65	69.90	6.75
July	234.25	213.95	20.30	146.75	132.55	14.20	87.50	81.40	6.10
August	276.80	260.15	16.65	225.55	212.20	16.35	48.25	47.95	.30
September	264.35	236.65	27.70	209.15	190.70	18.40	55.20	45.90	9.30
October	268.10	234.15	33.95	182.40	166.05	16.35	85.70	68.10	17.60
November	202.75	161.25	41.50	136.65	113.10	23.55	66.10	48.15	17.95
December	295.80	253.35	42.45	178.10	151.10	27.00	117.70	102.25	15.45
1991									
January	199.85	167.00	32.85	130.05	107.20	22.85	69.80	59.80	10.00
February	245.15	165.10	80.05	186.25	113.80	72.45	58.90	51.30	7.60
March	205.45	158.65	46.80	153.55	127.20	26.35	51.90	31.45	20.45
April	193.70	147.25	46.45	136.45	109.95	26.50	57.25	37.30	19.95
May	153.00	131.50	21.50	109.60	96.45	13.15	43.40	35.05	8.35
June	172.90	112.80	60.10	130.85	87.65	43.20	42.05	25.15	16.90

Source: NMTBA Industry Estimates

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UNFILLED ORDERS OF MACHINE TOOLS

1961 to 1990

(millions of dollars)

Year (as of Dec. 31)	Total	Metal Cutting	Metal Forming
1961	$ 467	$ 394	$ 73
1962	463	354	109
1963	628	475	153
1964	1,043	669	374
1965	1,311	899	412
1966	1,701	1,307	394
1967	1,317	1,089	228
1968	1,064	810	295
1969	1,195	812	424
1970	706	471	235
1971	569	408	162
1972	963	702	621
1973	2,074	1,454	621
1974	2,625	2,025	600
1975	1,450	1,062	388
1976	1,594	1,243	351
1977	2,308	1,795	515
1978	3,643	2,981	663
1979	5,388	4,546	843
1980	5,451	4,750	701
1981	3,300	2,873	427
1982	1,194	1,043	151
1983	1,045	823	222
1984	1,675	1,132	542
1985	1,658	1,243	414
1986	1,204	897	307
1987	1,000	672	327
1988	2,191	1,806	386
1989	1,804	1,423	380
1990	1,468	1,164	304

Source: NMTBA Industry Estimates

GLOSSARY

MACHINE TOOLS AND THE U.S. MACHINE TOOL INDUSTRY

A **machine tool** is a power–driven machine, not hand–held, that is used to cut, form or shape metal. Machine tools are typically installed as capital equipment in metalworking industries. Few if any products or services of an industrialized country would exist were it not for machine tools.

Production of automobiles, airplanes, home appliances, power plants, agricultural machinery, and most other products would be impossible without machine tools. Yet, because of their efficiency and longevity, machine tools themselves represent just a small part of the nation's output. If the entire U.S. machine tool industry was ranked by its 1990 shipments, it would be listed no higher than 143rd on the Fortune 500 of top companies by sales.

The industry is classified into two major industry subgroupings: Standard industrial classification code 3541, **metal cutting machines**; and 3542, **metal forming machines**. The major types of machines:

METAL CUTTING MACHINES

Boring Machines: used to enlarge, shape and/or finish a hole such as that made by a drilling machine (see below). Boring machines use a rotating cutting tool to cut a stationary workpiece.

Broaching Machines: using a long, toothed cutter to progressively form and finish a hole, slot, groove or contour in a single pass, as the cutter (or broach) is pulled or pushed in a straight line relative to the workpiece.

Drilling Machines: designed to make a hole in a workpiece by advancing a rotating tool, called a drill bit, into the stationary workpiece.

Electrical Discharge Machines (EDM): designed to remove metal by means of electrical discharge spark erosion.

Gear Cutting Machines: a specially designed milling machine used to form gear teeth on a cylindrically shaped gear blank.

Grinding Machines: used to remove materials from the workpiece with a grinding wheel.

Lathes: designed to remove metal by moving a cutting tool against a rotating workpiece. The axis of workpiece rotation may be either parallel to the floor as in a *horizontal lathe, or perpendicular to the floor as in a vertical lathe.*

Turning Center: a numerically controlled lathe with the capability to hold a number of tools. Some turning centers can perform limited milling, drilling, and boring operations.

Machining Centers: multi–function machines, typically combining boring–drilling–milling tasks. Machining centers have three or more axes of motion, have a contouring type numerical control and an automatic tool changer.

Milling Machines: designed to remove material using a rotating cutter which is also moved laterally with respect to the workpiece.

Station–Type Machines: provide several work processing locations (stations) in a single machine. The processes provided may include drilling, boring, milling, and finishing. Material handling capabilities are built–in to transport the workpiece from one work station to another. A transfer line is a type of station machine.

Tapping and Threading Machines: cut a "thread" into a hole by shaping its sides so that a matching piece (e.g., a screw) will fit. A tapping machine is similar to a drilling machine and many drilling machines have tapping capabilities. Threading machines are designed to take a turned workpiece and cut grooves into its sides (thus threading it in such a manner that it could fit into a tapped piece). A threading machine is similar to a lathe and most lathes have threading capabilities.

METAL FORMING MACHINES

Forging Machines: used to deform the workpiece into the desired shape by means of a single or repeated blows.

Die–Forming Machines: metal forming machines employing a pair of mating dies which, when forced against the interposed sheet of material, impart their contour on the otherwise flat sheet.

Bending Machines: designed to strain (bend) material which is usually in the form of bars or tubes.

Presses: machines having a stationary bed and a slide (ram) which has a controlled reciprocating motion toward and away from the bed surface and perpendicular to it. They are used to form and/or shear the workpiece (usually from flat sheet).

Shearing Machines: designed for straight–line cutting, involving the action of two opposing blades, one or both of which move during the shearing operation.

Punch Presses: cuts holes in stock. In general, any machine used to produce die–cut holes, regardless of shape.

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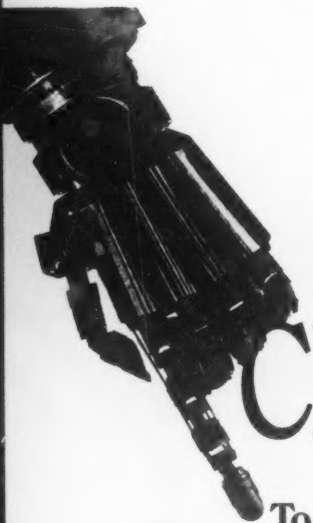

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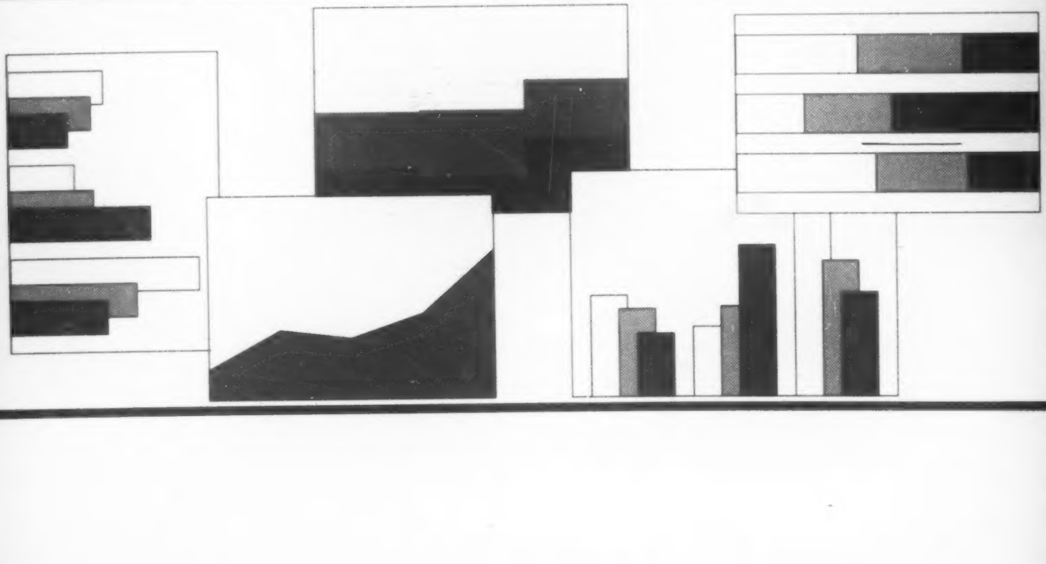
The Economic Handbook of The Machine Tool Industry



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GROSS NEW ORDERS, CANCELLATIONS, AND NET NEW ORDERS OF MACHINE TOOLS

Metal Cutting and Metal Forming

(millions of dollars)

	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
Year	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders
1971	$ 933	$ 72	$ 861	$ 655	$ 46	$ 609	$ 278	$ 25	$ 2[illegible]
1972	1,465	53	1,412	1,051	42	1,009	414	11	403
1973	2,773	160	2,613	1,958	132	1,825	815	28	787
1974	2,970	387	2,583	2,283	266	2,017	687	121	566
1975	1,651	374	1,277	1,198	282	916	453	92	361
1976	2,370	167	2,203	1,793	131	1,662	578	37	541
1977	3,153	158	2,995	2,329	127	2,202	824	31	793
1978	4,573	224	4,349	3,559	184	3,375	1,013	40	973
1979	6,063	442	5,621	4,873	378	4,495	1,190	64	1,126
1980	5,381	627	4,754	4,436	551	3,885	946	76	870
1981	3,585	640	2,945	2,799	571	2,228	786	69	717
1982	1,934	437	1,498	1,467	402	1,064	468	34	433
1983	1,890	194	1,696	1,328	177	1,152	561	17	545
1984	3,044	128	2,916	2,005	90	1,916	1,038	38	1,000
1985	2,716	188	2,528	1,983	130	1,853	733	58	675
1986	2,322	197	2,125	1,675	131	1,544	647	66	581
1987	2,253	134	2,119	1,533	82	1,451	719	52	667
1988	3,722	131	3,591	2,795	87	2,708	927	44	883
1989	2,987	179	2,808	2,119	143	1,976	867	36	832
1990	3,101	136	2,965	2,186	115	2,070	915	21	894

Source: NMTBA Industry Estimates

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GROSS NEW ORDERS, CANCELLATIONS, AND NET NEW ORDERS OF MACHINE TOOLS

(millions of dollars)

	METAL CUTTING			DOMESTIC			FOREIGN		
Year	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders
1971	$ 655	$ 46	$ 609	$ 565	$ 41	$ 524	$ 90	$ 5	$ 85
1972	1,051	42	1,009	916	39	877	135	3	132
1973	1,953	132	1,825	1,675	124	1,550	283	8	275
1974	2,283	266	2,017	1,959	243	1,716	324	23	301
1975	1,198	282	916	1,027	247	780	171	35	136
1976	1,793	131	1,662	1,594	117	1,477	199	14	185
1977	2,329	127	2,202	2,095	114	1,981	234	13	221
1978	3,559	184	3,375	3,203	160	3,043	356	24	332
1979	4,873	378	4,495	4,202	337	3,866	671	42	629
1980	4,436	551	3,885	3,986	490	3,496	450	61	389
1981	2,799	571	2,228	2,476	530	1,946	323	41	282
1982	1,467	402	1,064	1,262	373	890	204	30	175
1983	1,328	177	1,152	1,236	167	1,069	92	10	82
1984	2,005	90	1,916	1,780	80	1,700	226	9	216
1985	1,983	130	1,853	1,769	117	1,652	213	13	201
1986	1,675	131	1,544	1,499	122	1,377	176	9	168
1987	1,533	82	1,451	1,366	71	1,294	167	10	157
1988	2,795	87	2,708	2,392	76	2,316	403	11	392
1989	2,119	143	1,976	1,838	115	1,723	282	28	254
1990	2,186	115	2,070	1,867	95	1,772	318	20	298

Source: NMTBA Industry Estimates

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GROSS NEW ORDERS, CANCELLATIONS, AND NET NEW ORDERS OF MACHINE TOOLS

(millions of dollars)

	METAL FORMING			DOMESTIC			FOREIGN		
Year	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders
1971	$ 278	$ 25	$ 252	$ 244	$ 21	$ 223	$ 34	$ 4	$ 29
1972	414	11	403	378	10	368	36	1	35
1973	815	28	787	742	25	717	73	3	70
1974	687	121	566	583	113	470	105	8	96
1975	453	92	361	364	81	284	89	12	77
1976	578	37	541	513	28	485	64	8	56
1977	824	31	793	757	29	729	67	2	64
1978	1,013	40	973	938	37	901	75	3	72
1979	1,190	64	1,126	1,048	57	991	142	7	136
1980	946	76	870	814	70	744	132	6	126
1981	786	69	717	680	63	617	106	6	100
1982	468	34	433	399	28	372	68	7	62
1983	561	17	545	503	14	489	58	2	56
1984	1,038	38	1,000	967	36	932	71	3	69
1985	733	58	675	664	54	610	69	4	65
1986	647	66	581	567	60	507	81	7	74
1987	719	52	667	583	47	536	136	5	131
1988	927	44	883	788	39	749	138	5	134
1989	867	36	832	744	25	719	124	11	113
1990	915	21	894	774	13	761	141	8	134

Source: NMTBA Industry Estimates

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